KAIMON (HETEROPTERA: SCHIZOPTERIDAE), A NEW, SPECIOSE GENUS FROM AUSTRALIA

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The new genus *Kaimon* is described for 27 new species from Queensland, New South Wales and the Northern Territory. The following new species are described: *Kaimon epicarsius* sp. nov. (type species), *K. melanoriensis* sp. nov., *K. thorntonensis* sp. nov., *K. macdowallensis* sp. nov., *K. carbinensis* sp. nov., *K. sidereoriensis* sp. nov., *K. baroalbaensis* sp. nov., *K. finniganensis* sp. nov., *K. polysperes* sp. nov., *K. lambensis* sp. nov., *K. ancylonesioticus* sp. nov., *K. allonesioticus* sp. nov., *K. conwayensis* sp. nov., *K. micropterus* sp. nov., *K. webbensis* sp. nov., *K. pismaensis* sp. nov., *K. athertonensis* sp. nov., *K. allomelanoriensis* sp. nov., *K. leeiensis* sp. nov., *K. eungellanus* sp. nov., *K. kroombitensis* sp. nov., *K. alleungellanus* sp. nov., *K. notipolysperes* sp. nov., *K. byfieldensis* sp. nov., *K. plistonotius* sp. nov., *K. mesambrinus* sp. nov. and *K. bulburinensis* sp. nov.. The new species are figured and a key to submacropterous males provided. The new Australian species are associated with wet forest tracts at 0-1200m elevation along the eastern seaboard of the continent from Iron Range to Barrington House (12-32°S) and one species occurs in the Northern Territory. The presence of undescribed species in Indonesia and the Solomon Islands is noted. The relationship of the new genus with *Pachyplagia* Gross, *Ogeria* Distant and two undescribed genera from Fiji is outlined. The endemism, sympatry and diversity of species is summarised to reveal a few widespread macropterous species and many restricted submacropterous species. ❑ *Hemiptera, Schizopteridae, Ogeriinae, Kaimon, taxonomy, new genus, Australia, rainforest endemism.*

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Collections by the Queensland Museum and the Australian National Insect Collection in wet forest habitats of Australia, particularly coastal Queensland, since the 1970s yielded many specimens of Schizopteridae and Ceratocombidae. The largest generic set of specimens represents a speciose new genus allied to *Ogeria* Distant and *Pachyplagia* Gross. The generic description below is written in comparison to those genera (Hill, 1990a, 1990b). Only Australian species are described below (27 species) but two specimens from Sulawesi and the Solomon Islands are noted. *Ogeria* occurs in mainland Australia (13 species) with a similar range to the new genus and on the islands of Seychelles and Samoa. *Pachyplagia* occurs in eastern mainland Australia (7 species), Sulawesi (Hill, 1990a) and China (Ren, 1991). A cursory examination of 17 samples of Schizopteridae collected by Queensland Museum in Fiji suggests that *Ogeria* and two undescribed ogeriine genera occur there. Notes comparing these with Australian Ogeriinae are given in the discussion but a tabular comparison of their characters as in Table 1 for Australian Ogeriinae awaits further study.

The new genus and *Ogeria* are the smallest Australian Schizopteridae, some being less than a millimeter long. The micropterous females of the new genus have a distinctive, rotund, nymphal habitus but are heavily sclerotised. The males resemble small *Ogeria* but lack a pronotal collar.

The new species are difficult to describe using only drawing and light microscopy. They lack conspicuous diagnostic variation such as the inflated costal lobes of *Ogeria* and accessory male genitalia such as the anophoric appendage of *Pachyplagia*. The diagnostic but minute and complexly contoured paramercs and aedeagus are difficult to slide-mount and illustrate in a standard aspect. The subtle but diagnostic contour variations around the male vertex organ and adjacent pronotal disc are difficult to describe unambiguously in words and would reward scanning electron micrography.

METHODS

Methods are those of Hill (1992) but lack scanning electron microscopy. Some specimens were divided into several mounts after dissection, for example head and thorax residue in ethanol vial and abdomen, wings and legs on one to three

slides. Drawings of small slide-mounted structures such vesiea and leg apiees were done mostly by freehand. Larger body parts were drawn using a gratieule eyepiece and squared paper.

TERMINOLOGY. Terminology mostly follows previous papers by Hill (1990a, 1990b, 1992) which drew mostly upon Emsley (1969) but followed Štys (1969, 1974) for labrum, epipharygeal projection (the labrum of Schuh & Slater, 1995) and pretarsi. The arolium of Štys is the empodial vesicle of Emsley and the pulvilli of Štys are the auxillae of Emsley. However, the pulvilli are now regarded as parempodia as in Štys in Schuh and Slater (1995). Maerosetae are conspieuously long and/or thick setae and qualified as stout if they are thiek. Setae on appendages display a continuous spectrum of lengths and diameters but a few diagnostic distinctions are used for the largest setae on the hind tibiae.

Emsley (1969: 29) said '*Ogeria* and *Pachyplagia* are exeeptional in their dorsally heavily selerotised and papillate abdomen'. The new genus shares this type of abdomen but the term carinulate (provided with small carinae) is used here beeause the tergal seulpture is heavily sclerotised and the 'papillae' coalesce into ridges. The term granulate is used where earinulae fragment such as on the first abdominal tergum of some species.

Esaki & Miyamoto (1959) used tetramerous fore and mid tarsi in males as a subfamily charaeter when establishing the Hypselosomatinae. Emsley used the term pscudotetramerous because sueh tarsi are are not truly tetramerous. He said (p. 19) they oecur 'only in *Hypselosoma* and *Silhouettannus*' and figured the latter, a Sehizopterinae. He also said in his definition of the Hypselosomatinae (p. 83) that they oeeur 'in several other non hypselosomatine genera'. Štys (1982) used the term humpbaeked for similar swollen, telescoped tarsi when establishing the eeratoeombid genus *Kvamula* Štys. The trimerous, telescoped, inerassate tarsi (male fore- and mid legs) of the new genus *Kaimon*, *Hypselosoma* Wygodzinsky, *Pateena* Hill and *Kvamula* appear similar and the term inerassate is adopted here in preference to pseudotetramerous.

Colour notes are not definitive. Colour is subtle and cannot be determined accurately in ethanol preserved specimens and cannot always be retrieved by drying especially if speeimens are stained by label dye.

Monteith (1997) and Yeates et al. (2002) are followed for regional terminology.

ABBREVIATIONS. DAE= distance aeross eyes; DBE= distance between eyes; HE= height of eyes in lateral view; HH= height of head in lateral view; L= labial segment; LFT= length of fore tibia, LHT= length of hind tibia; LA3 and LA4= length of antennomeres 3 and 4; LB= length of body exeluding wings in lateral view; S= abdominal sternum; T= abdominal tergum; LP= left parmere; RP= right paramere; B= berlesate; D= dry; FIT= flight intereept (trough) trap; L= litter; m= moss; OF= open forest; PT= pitfall trap; PK= pyrethrum knoekdown; RF= rainforest; SL= sieved litter; mae.= macropterous (male), sub.= submacropterous (male); NQ= northern Queensland, CQ= central Queensland, SQ= southern Queensland.

The following frequently listed colleetors are listed by surname only: A. Calder; D. Cook; V.T. Davies; J. Gallon; H. Janetzki; G.B. Monteith; S. & J. Peek; G.I. Thompson; T. Weir, D.K. Yeates. Other abbreviations are: MYT for Monteith, Yeates & Thompson; MY for Monteith & Yeates; MT for Monteith & Thompson ; MT/ANZSES for ANZSES team led by Monteith & Thompson; ANZSES for ANZSES team; EQM for Earthwatch team led by Queensland Museum staff.

DEPOSITORIES. Queensland Museum (QM), Australian National Insect Collection (ANIC) .

Order HETEROPTERA
Family SCHIZOPTERIDAE
Subfamily OGERIINAE

Kaimon gen. nov.
(Figs 1-19, Tables 1-4)

TYPE SPECIES. *K. epicarsius* sp. nov.

ETYMOLOGY. *Kaimon*, male noun, from my son's middle name which is a phonetic version of the Greek genitive noun *chimon*, winter.

DISTRIBUTION. Australia (Table 4), Indonesia, Solomon Islands.

DIAGNOSIS. Fitting the definition of the Ogeriinae (Emsley, 1969) with a 4-segmented labium and 3 pairs of abdominal spiraeles but with 4, not 5, veins emanating from trapezoidal eell of the fore wing and a globular to oblong but not elongate, spermatheca. Small, rotund, robust, 0.7-1.2mm long, lacking a pronotal collar, with tarsi 3,3,3 in male and 2,2,3 in female, with incrassate male fore and mid tarsi, with carinulate

abdominal dorsum in males of all pteromorphs but unsculptured dorsum in micropterous, female nymphs. (Table 1)

DESCRIPTION. *Colour.* Light yellowish brown to dark reddish brown, head and disc occasionally with pale patches, appendages yellow-brown to brown, forewings sometimes with cream basal cells that form a pale transverse band across the body when the wings are in repose, micropterous wing pads of females cream or brown, eyes red.

Size and Shape. Males commonly submacropterous but macropters occur in 6 species (4 described here), roughly 0.9-1mm long respectively (Table 2), rotund, 0.5mm wide, male of 1 species micropterous; broadly oval in dorsal view; head declivent; pronotum of macopters steeply inclined; pronotum of submacropters weakly inclined and with specifically diagnostic, complex contours, often decurved anteriorly, occasionally overhanging vertex; pronotal collar absent; abdominal dorsum highly convex, with longitudinal carinate microsculpture. Females micropterous, with rotund, nymphoid habitus, 0.93 (0.76-1.04)mm long, 0.5mm wide; dorsum convex in lateral view; pronotum not inclined, without complex contours; abdominal terga smooth, not carinulate.

Dimensions. (Table 2). Relationships between dimensions for submacropterous males are, with ranges in parentheses when known: DBE = 53% DAE (48-63%); HE = 44% HH (35-53%); HE = 33% DAE (27-38%); LA3 = 76% LA4 (68-86%); LA3+LA4 = 58% LB; LFT = 64% LHT (59-74%); LHT = 48% LB; LHT = 89% WP; LP = 56% WP (49-71%); LB = 192% WP (170-230%) and DAE = 84% WP. Pronotum relatively longer and more variably so in submacropterous males than females, that is, for females LP = 43% WP (38-46%). LP greatest in macropterous males and least in females. Pronotum wider in macropterous males than females and submacropterous males. LB (submacropterous male) = 97% LB (female), range 91-104% (Table 3). LHT, LFT, LA3, LA4, DBE do not vary between pteromorphs or sexes.

Head. Head short in lateral view, curvature of frons less convex in posterodorsal view than in *Ogeria*, weakly to strongly flattened in lateral view in some species (Fig. 6E,F); not as tall in anterior view as *Pachyplagia*; areas laterally to labrum squarely inflated like *Ogeria* but excavated to accommodate antennal bases; genae without long, procurved setae (unlike *Pachyplagia*); lateral frons with 2 pairs long setae, longer pair recurved, shorter pair procurved, inserted above antennal bases on pair of faint ridges (Fig. 2A-C) which perhaps indicate path of frontal suture and which run parallel to and ventrally to frontal cibarial muscle scars; central frons with about 3 pairs of inconspicuous, incurved setae medially (*Ogeria* has 3 conspicuous pairs, *Pachyplagia* none); cibarial muscle scars of vertex apparently fine punctures; 4 arcs of cibarial muscle scars on vertex and frons more or less merge to form 2 larger arcs (left and right) in an X-shape; vertex with 1 lateral pair of parocular macrosetae curving over the eyes; male vertex usually with conspicuous pit or U-shaped groove and lobe, specifically diagnostic in detail but vestigial in some species (Figs 2A-D, 3-9); ocelli present only in macropters, located 1 ocellar-diameter from eyes and 2 diameters ventrally to the parocular macrosetae (Fig. 2A-D); eyes large, coarsely faceted, medial margins more or less parallel in dorsal view; labrum oblong, base semicircular, apex square, with 5 macrosetae (1 proximal and 1 distal pairs of long procurved macrosetae plus single, central very long procurved macroseta); labium 4-segmented (Fig. 10K), reaching posterior margin of fore coxae; epipharyngeal projection reaching apex of L2 (Fig. 10A); bucculae inconspicuous (as in allied genera), open posteriorly, confluent with medial extensions of proepisternal rims, forming labial cradle (Fig. 10B,C); antennae reaching mid abdomen, A3 curved, A4 straight.

Prothorax. Pronotum weakly convex, fine punctures of disc (perhaps stellate microtubercles) restricted to posterior quarter (coarse and on whole disc in *Ogeria*), collar absent; pronotal contours often specifically diagnostic in submacropterous males (Figs 3-9); pronotum not separable from head by dissection, suture bearing internal phragma widening laterally of vertex pit when latter present (Fig. 10B,C); posterior margin strongly and sinuously convex in macropters, weakly and sinuously convex, straight or rarely concave in submacropters and micropters; lateral margins in dorsal view weakly sinuate and convergent in macropterous males, sinuate and convergent or parallel in submacropterous males, weakly convex and convergent in females; lateral margins tumid or not in males, that is, in sectional view there is an inflexion of both the disc and the propleurae near the margin (Fig. 2B,C) or only the disc (compare Fig. 2A).

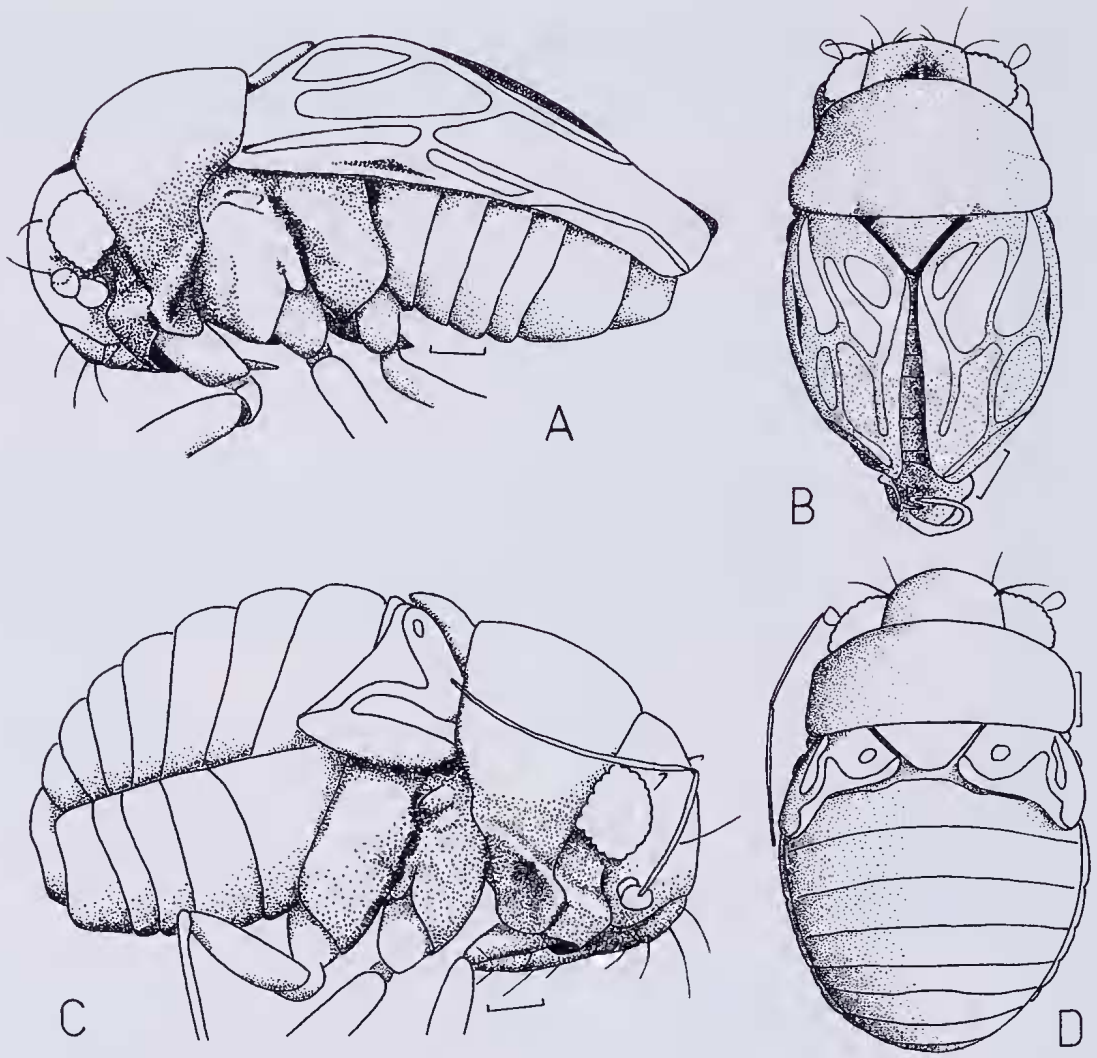

FIG. 1. Submacropterous ♂ and micropterous ♀ habitus. A, ♂ *K. allomelanoriensis*, lateral; B, ♂ *K. melanoriensis*, dorsal; C, ♀ *K. allomelanoriensis*, lateral; D, same, dorsal. Scale lines 0.1mm.

Propleurae short, inflated; proepisternum and proepimeron of equal vertical length; propleurae shorter vertically and more broadly inflexed in ventral portion in females than in males; propleurae forming well-defined shelves supporting antennal bases (as in *Ogeria* and to a lesser extent, *Pachyplagia*), proepisternum forming most of shelf, proepimeral portion of shelf tapering posteriorly in most species but in a few species widening (in dorsal view) to rectangular (Fig. 4B-D) or acute angle (Fig. 14O) (including females of some species, at least); medial extensions of proepisternal rims and bucculae embracing base of labium; rims and bucculae lacking opposing tubercles. Prosternum steeply inclined.

Pterothorax: (Fig. 11) Apex of scutellum, in lateral view, not projecting posterodorsally (unlike *Pachyplagia*); triangular, not reaching posterior margin of metanotum in males; rounded, reaching posterior margin of condensed metanotum in females; scutellum with large deep lateral pits near intersegmental junction in males, smaller pits in females. Metanotum of males well

TABLE 1. Comparison of *Kaimon, Pachyplagia* and *Ogeria*. Dimensions in millimeters. 1, spines probably homologous with branches as they lengthen; 2, hooded in one undescribed Fijian ogeriine genus.

Character	*Pachyplagia*	*Ogeria*	*Kaimon*
Length overall	1.3-1.4	0.8-1.2	0.8-1.2
Ratio LHT/LB	0.54	0.42	0.48
Ratio LFT/LHT	0.60-0.72	0.60-0.72	0.59-0.74
Ratio HE/HH	0.25	0.26-0.38	0.35-0.53
Ratio HE/DBE	0.33	0.17-0.24	0.47-0.53
Ratio DAE/DBE	1.30-1.40	1.48-1.77	1.60-2.10
Ratio LA3/LA4	1.15-1.40	0.91-1.04	0.68-0.86
Frons cibarial muscle scars	discrete from vertex group	not evident	concurvilinear with vertex group
Form vertex cibarial scars	deep furrow ×2	4 coarse pits ×2	several fine pits ×2
Male vertex pit	absent	absent	present
Pronotal collar	present	present	absent
Male fore and mid tarsi	slender	slender	incrassate
Male tarsal formula	2,2,3	3,3,3	3,3,3
Female tarsal formula	2,2,3	3,3,3	2,2,3
Macropterous males	yes	yes	yes
Submacropterous males	no	yes	yes
Brachypterous males	no	yes	yes
Micropterous males	no	no	yes
Macropterous females	yes	yes	no
Submacropterous females	yes	yes	no
Brachypterous females	no	yes	no
Micropterous females	no	yes	yes
Mesosternal keel	small	medium	large
Contouring of S2/3 to coxae	moderate	strong	stronger
Thorax/abdomen articulation	ball and socket	none	ridge and groove
S2/S3 articulation	ball and socket	ball and socket	none (connate)
Posterior margin genital capsule	convex	convex	emarginate
Gen. cap. aperture constriction	at <0.5 from anterior	at midlength	at >0.5 from anterior
Vesical loops	one or more	one or less	one or less or sinuous
vesical spines/dentition	absent-basal singular	absent-elaborate	absent-subapical minor
Vesical branch length [1]	absent	absent or short	absent, short or long
Carinulation of male dorsum	T1 - T6	T1 - T8	T1 - T7
Length of carinulae on T3-6	half tergum	full tergum	third to half tergum
Left paramere form	short, oblong	short, oblong	long, slender
Left paramere basal digit	present	present	absent
Right paramere form	long, slender	short, tapering	very short, trilobate
Size of parameres	L<R	L=R	L>R
Anophore form	tubular	dorsally tubular	completely ringlike
Anophoric appendage	present	absent	absent
Anal aperture from T9 margin	0.3-0.5 diameters in	0 diameters in	2-3 diameters in
Profile female anus [2]	flush with T9	flush with T9	raised, not hooded
Gonagulum struts	asymmetrical	absent	absent
Anterior gonapophyses	asymmetrical	symmetrical	symmetrical
Posterior gonapophyses	fused, transverse plate	discrete, sclerotised	?transverse membrane
Spermatheca	oblong	absent	Globular-short oblong

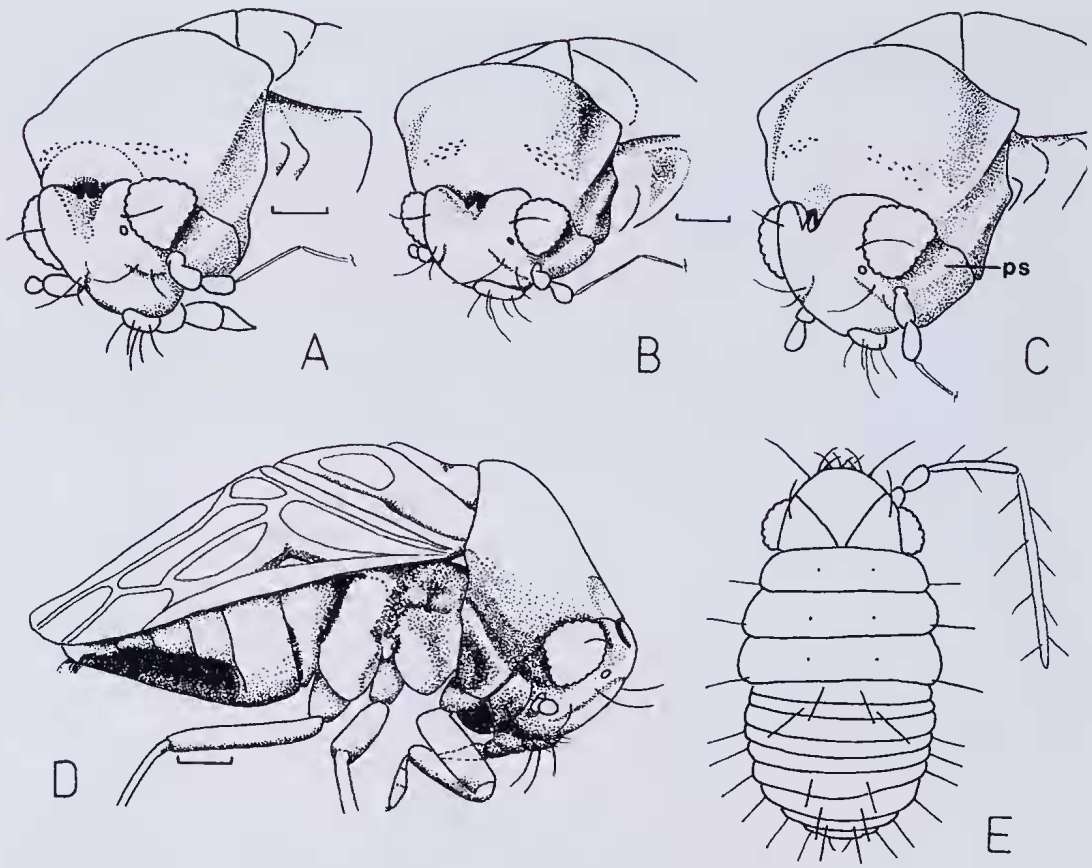

FIG. 2. A-D macropterous ♂♂. A, *K. epicarsius*; B, *K. sidereoriensis*; C, *K. polysperes*; D, *K, notipolysperes*; E, early instar nymph *K. notipolysperes*. Scale lines 0.1mm. ps=propleural shelf.

developed, bearing faint longitudinal carinulae; metanotum of females condensed; lamina projecting from posterior margin of metanotum narrow, with convex margin, largest in macropters, absent in females.

Mesopleurae with 2 tumescences near dorsal ends level with propleural and metapleural shelves. Metepisternae large and inflated, dorsal ends forming shelves probably supporting A4 and forewings in repose, shelf smaller in (micropterous) females; metapleurae not articulating with abdomen by ball and socket system (see Hill, 1990a) but tumid posterior margins of metepisternae weakly slotting into raised groove on S2/3 formed by parallel sublateral carinae (Fig. 14N); metepimera small, of males with slight protuberance at dorsal end of posterior margin complementing truncate anterolateral angles of abdominal S2+3.

Lateral parts of mesosternum steeply inclined, forming posterior walls of midcoxal cavities, delineated laterally from metepisternae by vertical carina extending ventral to and colinear with groove separating meso- and metapleurae. Mesosternal keel large, interlocking anteriorly with posterior notch of prosternum, oblique ventral edge colinear with metasternal keel in profile; metasternal keel not embraced by medial ends of transverse carinae that border anterior margins of mid coxal cavities unlike *Pachyplagia* and *Ogeria* (Hill, 1990 erroneously described these carinae as posterior to midcoxal cavities in *Ogeria* although posterior carinae do also occur in that genus), posteroventral angle produced acutely, embraced by hind coxal spicule pads; metendosternite slender, apically bilobed.

Legs. (Fig. 12) male tarsi 3,3,3, female 2,2,3, not elongate, male fore- and midtarsi incrassate (unlike *Ogeria* and *Pachyplagia*) and with membranous, inflatible arolium; all legs both

sexes with pairs of setiform parempodia as long as claws; fore tibiae enlarged apically, with 3-4 stout, apical macrosetae and anteroventral comb of 5 setae; mid tibiae with 4 stout, apical macrosetae and posterior comb of 5 setae; hind tibia with 1 stout, posteroventral macroseta located 0.71-0.84 from base of tibia and 1.1-2.9 tibial-diameters long, 1 anterior macrosetae located 0-1.3 tibial-diameters proximally of posteroventral and 0.6-0.9 tibial diameters in length, sometimes two finer posteroventral macrosetae <1 tibial diameter in length near stout, posterovental macroseta, 3 stout, apical macrosetae, ventral row of around 8 erect, fine setae of almost tibial diameter in length; fore and mid tibiae subequal; LFT/LHT 0.65 (0.58-0.74) for all pteromorphs. Nymph 2, 2, 2, with setiform parempodia.

Wings. (Fig. 13) Fore wings of females always micropterous, of males usually submacropterous but also macropterous in some species (pterygodimorphic) or rarely mieropterous; micropterous wings moulded to contours of meso- and metanota, reaching posterior margin of T2 (females) or T4 (males); submacropterous fore wings reaching abdominal apex; macropterous fore wings extending beyond abdominal apex, adding 15% to length overall; male forewings with short, ventral carina along posterior margin of costal cell near base ofm junction complementing mesepimeral contours; macropterous costal lobe sclerotised but not inflated, uniform from species to species, 4 veins emanating from trapezoidal cell (Fig. 13A), 2 veins reaching apical margin (1 or 2 in submacropters, Fig. 13E-F), vannal vein (lettered 3 in Fig. 13E) almost reaching wing apex, representing third free vein but sometimes anastomosing with preceding vein; wing coupling (Fig. 13C) adjacent to 2V, (like Emsley, 1969, fig. 65). Hind wings large and quadrilobate in macropters, 3 veins, slender jugal lobe; hind wings absent in other pteromorphs.

Abdomen. Abdominal dorsum and venter strong and rigid, separated by narrow, lateral membranes. Abdomen without sockets for articulation with thorax but with paired sublateral carinae on S2+3 embracing posterior margins of metepisternae (Fig. 14N). Venter hemicylindrical. Dorsum more arched than venter, not sexually dimorphic in general contours but carinulate if covered by forewings (males) (carinulae present but diminished in micropterous male), not carinulate if exposed (females). T8 discrete from T1-7 in males.

Male dorsum (Figs 14A-C, 15A-C) T1-7 fused into rigid dorsal plate, more or less equally convex; intersegmental sulci reaching lateral margins of plate; T1 narrow, T1-2 more fused than T2-7 with sulcus merely a sinuous depression; male T2-7 each with 12-16 parallel, longitudinal carinulae occupying anterior two-thirds or more of each segment (but only one-third in mieropterous male of *K. micropterus*) and linked posteriorly on each tergum by raised, smooth, transverse band that widens laterally; carinulae often sinuate, bent or incomplete and not strictly colinear from segment to segment; incomplete submedial carinulae appear as dots or short dashes on T3-5 in same irregular pattern in many species (Fig. 15B), no narrow transverse carina additional to the transverse bands on T3-6 (unlike *Ogeria*); carinulae of T1 distinct (Fig. 15A), reduced to illdefined triangles or merely granular (Fig. 15B); anterior and posterior margins of T2-7 not decurved except anterior margin T7 but T2-7 each with transverse gutter at one-third from anterior margin; adjoining margins T6 and T7 not decurved but possibly flexible; posterolateral angles T7 roundly produced posteriorly a little, T7 twice as broad as preceding terga, granulate or not in posterior half (granulate in *K. sidereoriensis*, not in *K. pismaensis*); lateral margins T1-7 narrowly deflexed to form smooth rim parallel to sternal margins and separated from them by a narrow membrane; adjoining margins T7 and T8 not intimately connected; T8 asymmetric, with high, transverse carina near anterior margin delimiting smooth, inclined posterior area, 2 oblique carinae branching from the submarginal anterior carina subdivide posterior area; no discrete laterotergites but T8 deflexed at both ends as vertical struts lying internally to S7, spiracles near deflections, apices of struts connecting to S8 membranously and asymmetrically.

Female dorsum (Figs 1D, 15E) T1-8 fused into rigid dorsal plate; T1-8 not carinulate, relatively uniform and equally convex but T1 very narrow; T1-2 not more fused than T2-8 but sulcus sinuate; sulcus between T7 and T8 procurved to S6-7 sulcus; intersegmental sulci of T1-6 stop before reaching lateral margins of dorsal plate; lateral margins T1-8 narrowly deflexed to form smooth rim parallel to lateral margins of venter and separated from them by a narrow membrane anterior margins of T2-8 weakly decurved, posterior margins not; T2-8 each with around 16

submarginal, anterior tubercles; T8 not depressed posteriorly; no discrete laterotergites.

Venter S2 and S3 partly fused (Fig. 14H), line of fusion obscure laterally, no interlocking process and socket laterally; S2 membranous medially and bearing tiny rugose sclerite anteromedially which may be vestige of S1; S3 with small membranous area and larger rugose pad anteromedially; S2+3 steeply inclined forming posterior wall of hind coxal cavity, contours more closely complementing coxae than in *Ogeria*; S3 with pair of conspicuous carinae posterior to coxal impressions and S2 with lesser pair of carinae near lateral ends of S3 carinae together loosely embracing metepisternae (Fig. 14N); S4-7 each with about 26 anterior, submarginal tubercles; posterior margins of male S5 and S6 possibly narrowly, symmmetrically overhanging following sternum in many species but in some an asymmetric ledge projects (Fig. 14F,I) or a digitiform ledge in one undescribed species; discs S5 and S6 asymmetric in some species in conjunction with S7 impression; male S7 large, disc asymmetrically contoured to greater or lesser extent, conforming to retracted genital capsule, frequently impressed left of midline; posterior margin male S7 concave and variably asymmetric, sometimes strongly produced on right posterior margin (southern species); male S8 narrow, reflexed internally above posterior margin of S7 (Fig. 15D), connecting to T8 by asymmetric membranes from midline (to right) and from left side (to left); female S7 slightly larger than preceding sterna; female S8 narrow, reflexed internally above S7 (Figs 15E, 19I).

Spiracles on S6, S7 and T8 sclerites in both sexes.

Male Terminalia. (Figs 15-19) Genital capsule mostly overlapped by S7 in repose, anteriorly reaching S6, half to two-thirds of floor is anterior to anophore and hyaline (Fig. 15I); extreme anterior margin not inflexed but anterolateral margins upcurved; posterior margin in ventral view usually roundly oblique and medially emarginate; left posterior broadly rounded but with small, acute tumescence in some southern species; right posterior angle smaller, bearing indistinct (Fig. 14I), acute (Fig. 14L-M) or spinous tumescence (Fig. 14C,F); faint transverse carinae on left side of dorsal aperture marking line of overlap with T8, no or fainter carina to right of aperture (Figs 17A, 18A). Short, square anophore ring (not as long as *Ogeria* and *Pachyplagia*), without process, lying in constriction of dorsal aperture of capsule, right side with indistinct condyle articulating with capsule. Parameres clearly asymmetric, relatively uniform across species; left paramere (Fig. 19D) with bulbous base, long, curved spinous arm varying twofold in length between species, no basal digit; right paramere small, stout, bi- or trilobate, concave face conforming to aedeagal conjunctive, with basal digit. Basal plate a slender, arc-like, irregular sclerite. Aedeagus similar to *Ogeria* and *Pachyplagia*, 3 conjunctival sclerites forming conjunctiva (which probably includes phallobase of Emsley (1969)) embracing spherical reservoir between basal plate and base of vesica, 1 sclerite with obscure or conspicuous spinous process (Figs 15J, 16I, 18D, 19E); vesica spinous, projecting to right to form tighly recurved loop (Fig. 1B), an incomplete, spiralled loop (Figs 16I, 17G,F) or sinuous path (Figs 16A, 17E); vesica without major dentation but some species (northern Queensland) with single, subequal or longer branch (Figs 15J,K, 16A-F,H, 17A-C,E,F, 18A, 19D) or short, subapical branch (Fig. 19A-C), vesica and/or branch apices simple, bifid or bearing small tooth, some species (southern Queensland) without vesical branch (central Queensland species with or without branch).

Female Terminalia. T9 hinges from near vertical plane in repose to horizontal in extension, with broad, inflexed, hyaline marginal flange internally overlapping S7 in repose; external, submarginal carinae present but gonagulum struts absent; sclerotised anal tube located centrally in roof of T9, aperture remote from posterior margin; extensible membranous anal tube without sclerites; anterior gonapophyses (Fig. 19F-I) in form of a pair of elongate tapering, membranous lobes with longitudinal concavity along inner faces and vestigial, longitudinal, sclerite; posterior gonapophyses obscure and membranous, possibly fused as a tranverse membrane; no asymmetry evident; spermatheca present on left side at level of S6-7 interface (Fig. 15E), globular or bilobate (Fig. 19J-L).

GENERIC MORPHOLOGICAL NOTES. *Male Vertex Organ*. There is a geographic trend to modification and loss of the vertex organ. Broadly, northern species have an open pit, central species have a lobe covering the pit or an evaginated area while southern species have secondarily lost the pit.

Discrimination of species relied heavily upon the vertex and the adjoining area of the pronotal

TABLE 2. Dimensions of males (submacropterous or micropterous) and females of *Kaimon* in millimeters. N, number of specimens measured.

Kaimon	Males						Females					
	LHT	WP	LB	DAE	LB	-	LHT	WP	LP	DAE	LB	1
epicarsius	0.41	0.50	0.27	0.41	0.41	30	0.45	0.53	0.24	0.41	0.97	18
melanoriensis	0.42	0.50	0.25	0.41	0.84	1	1	1	1	-	1	1
thorntonensis	0.44	0.44	0.24	0.44	0.86	7	0.44	0.47	0.20	0.41	0.81	-
macdowallensis	0.41	0.41	-	0.36	0.91	1	1	1	1	1	1	1
carbinensis	0.36	0.41	0.21	0.48	0.78	1	1	1	1	1	-	1
sidereoriensis	0.44	0.42	0.41	0.46	0.76	2	0.35	0.41	0.17	0.39	0.80	18
baroalbaensis	0.45	0.41	0.20	0.35	0.76	1	0.34	0.39	0.15	0.45	0.76	1
finniganensis	0.42	0.44	0.25	0.40	0.80	4	0.44	0.50	0.21	0.42	0.45	4
polysperes	0.17	0.54	0.28	0.42	0.50	30	0.45	0.54	0.28	0.44	0.48	23
lambensis	0.50	0.50	0.28	0.42	0.42	7	1	-	1	1	-	-
ancylonesioticus	0.41	0.42	0.25	0.38	0.84	4	0.41	0.47	0.21	0.41	0.92	4
allonesioticus	0.42	0.45	0.25	0.38	0.91	1	0.42	0.48	0.21	0.42	0.92	1
conwayensis	0.45	0.44	0.28	0.41	0.44	2	0.44	0.50	0.22	0.47	0.50	6
micropterus	0.37	0.41	0.24	0.35	0.82	6	0.43	0.42	0.17	0.45	0.84	5
webbensis	0.36	0.41	0.21	0.44	0.84	1	0.46	0.41	-	0.44	0.81	1
pismaensis	0.41	0.50	0.28	0.40	0.48	2	0.44	0.51	-	0.43	0.50	4
athertonensis	0.42	0.50	0.27	0.42	0.48	5	0.46	0.50	0.21	0.44	1.03	4
allomelanoriensis	0.45	0.45	0.24	0.39	0.91	1	-	-	-	1	-	-
leeiensis	0.42	0.50	0.28	0.40	0.50	1	-	-	1	-	-	
eungellanus	0.50	0.44	0.28	0.38	0.50	1	0.42	0.50	0.22	0.41	0.48	1
alleungellanus	0.50	0.48	0.34	0.41	0.47	2	0.42	0.52	-	0.42	0.50	1
notipolysperes	0.44	0.50	0.27	0.40	0.48	-	0.41	0.50	0.22	0.42	0.50	6
byfieldensis	0.45	0.48	0.31	0.40	0.97	2	0.42	0.53	-	0.42	1.04	1
kroombitensis	0.44	0.48	0.32	0.40	0.97	2	0.42	0.49	0.23	0.40	0.95	6
plistonotius	0.43	0.50	0.25	0.41	0.97	2	0.42	0.51	0.25	0.41	0.94	3
mesambrinus	0.42	0.48	0.25	0.41	0.97	1	0.43	0.53	0.24	0.43	0.99	1
bulburinensis	0.41	0.48	0.28	0.39	0.91	1	0.42	0.50		0.42	0.94	1
Mean	0.42	0.47	0.25	0.39	0.90	-	0.42	0.49	0.21	0.41	0.93	-

disc in submacropterous males. Descriptions of the vertex organ in anterior, lateral and dorsal view are provided for each species but scanning electron micrographs of the same area for all species would have been less ambiguous. In species from NQ, Northern Territory (and Solomon Islands) the male vertex organ is typically a conical invagination of the vertex projecting into the head at its interface with the pronotum. The internal apex may bear an aperture (Fig. 10J,G). A longitudinal carina running along the anterior face partly partitions the pit into right and left chambers. The dorsal end of this carina or partition is visible externally at the aperture of the pit and termed the medial ridge here (Fig. 10I). The ridge is flush with or recessed below the plane of the aperture and merges with the anterior rim of the pit either confluently or disjunctly.

In 6 species from NQ (Fig. 3A-F) the vertex around the pit aperture is impressed so that the aperture lies below the general plane of the vertex. In such cases the anterior edge of the pit is not sharply defined. In other species from NQ the aperture is not depressed and the anterior edge of the pit is sharply defined and flush or occasionally labiate (Figs 3H-L, 4A-G). The lateral margins of the pit are sometimes inclined as they approach the pronotum. The terms inner and outer rims are used to distinguish the lower or inner edges from the upper or outer edges of the rim near where it meets the disc. In the species from the NT the pit is not depressed but the anterior edge is roundly rather than sharply

defined and lies concentrically within a moat-like depression formed by the cibarial muscle scars (Fig. 3G).

In species from CQ and 1 from SQ the aperture is obscured by a lobate protrusion of the vertex from the anterior margin of the pit so that a U-shaped slit is seen in dorsal view of the vertex (Fig. 4H-L). In *K. eungellanus* the internal pit-organ is globular (Fig. 10F-G) whereas in *K. alleungellanus* and *K. notipolysperes* it is conical (Fig. 10H,E). The lobate vertex organ perhaps lacks a carinal partition but possesses a cylindrical crest along its posterior face. This is visible in internal view of the cleared head (Fig. 10E).

In *K. kroombitensis* from CQ the vertex organ is evaginated and separated by a cleft from the vertical anterior lobe. The organ forms a vertical posterior lobe of the vertex that adjoins the overhanging anterior margin of the pronotal disc. The cylindrical crest mentioned above is present internally on the posterior lobe of the vertex.

Three species from CQ and SQ and NSW lack the organ probably as a secondary loss. Vestiges appear in the contours of the vertex and adjacent pronotal disc (Fig. 9).

Perhaps this organ (secretory or sensory) is analogous with others 'sensory areas' (Hill, 1984) that occur on various parts of the male body in locations characteristic of genera, for example the clypeal, labral, fore tibial and sternal (S1) organs in *Hypselosoma*, the recessed pronotal collar complemented by a vertex furrow in *Cryptomannus*, the setigerous pronotal furrow in *Rectilamina*, the setigerous clavus accompanied by a cavity of the adjacent scutellum in *Duonota*, the minute corial apex organ of *Pachyplagioides* and perhaps the costal lobe of *Ogeria*. Such an organ is absent in *Pachyplagia*.

Thorax. Emsley noted that the schizopterid metendosternite, a posterior process of the metasternum, 'projects into the abdomen' but in Australian Schizopteridae it projects almost vertically down, running posterior to the hind coxal bases and lying external to the base of the abdomen. It may restrain the hind coxal bases posteriorly.

The venation of submacropters and micropters is sometimes unstable within individuals in that veins may or may not anastomose distally or distal veins may fail to appear (Fig. 13E,F). Some indication of this is given above in the generic description and below in species descriptions.

TABLE 3. Proportions for species of *Kaimon* as percentages. sm, submacropterous male; f, female.

Kaimon	LBsm/LBf	LP/WP sm	LP/WP f
epicarsius	44	54	44
melanoriensis	-	51	-
thorntonensis	44	55	44
macdowallensis	-	-	-
carbinensis	-	-	-
sidereoriensis	44	56	46
baroalbaensis	100	44	38
finniganensis	44	57	42
polysperes	44	54	44
lambensis	-	58	-
ancylonesioticus	64	60	45
allonesioticus	49	56	44
conwayensis	96	64	45
micropterus	46	49	44
webbensis	100	44	-
pismaensis	92	56	-
athertonensis	65	54	38
allomelanoriensis	-	54	-
leeiensis	-	65	-
eungellanus	100	49	49
alleungellanus	100	71	-
notipolysperes	101	55	44
byfieldensis	44	64	-
kroombitensis	102	67	45
plistonotius	103	50	46
mesambrinus	-	52	45
bulburinensis	97	58	-
Mean	97	57 (49-71)	43 (38-46)

Abdomen. The shape of S7 varies but is not as easily used as in *Ogeria* to diagnose species but would yield useful characters with scanning electron micrography. In all species the right posterior corner is produced posteriorly to a greater (southern species as in Fig. 14G,J) or lesser extent (northern species as in Fig. 14C,F,I). Accompanying this trend is a large depression of the right side of S5-7 discs in southern species. Two northern species have a diagnostic depression adjoining a tumescence on the right side of the S7 disc near its posterior margin (Fig. 14C).

Although the contours of T8 appear to complement the retracted, sinuous vesica in *K. epicarsius* it was not possible to document variations of T8 in other species linked to their uniramous, biramous, looped or non-looped

vesical forms. Variations that were detected appeared to be minor.

Vesica. The path of the gonoduct is difficult to determine. In some species it was unclear whether the longer or shorter ramus of a biramous vesica bore the gonoduct and which to term the vesical branch versus the vesica. In many species the vesica and branch form an incomplete spiralled loop. In *K. epicarsius* and *K. finniganensis* the vesica follows a sinuous tricurvilinear path with two right angled bends in different planes followed by a recurved bend distally. In *K. melanoriensis* the vesica follows a tight U-shaped bend at mid length. In *K. ancylonesioticus* it is apically recurved but in a direction opposite to the curvature of the proximal portion.

Ratios. Various ratios such as DAE/DBE, HE/HH, HE/DAE and LHT/LB were plotted. No outlying species were detected. Similarly, the length and position of the two distal but non apical macrosetae on the hind tibae revealed no outlying species and sufficient variation within species and between left and right of individuals to constrain their use in diagnosis. For example in 4 specimens of *K. sidereoriensis* the position of posteroventral macroseta 0.78-0.84 from the base of the hind tibia, its length 0.107-0.145 of tibial length or 1.5-2.2 of tibial diameter. However the posteroventral macroseta is long (2-3 tibial diameters) in species from SQ and NSW.

GENERIC DISCUSSION. Emsley (1969) defined the Ogcriinae as having 5 veins emanating from the trapezoidal cell, a 4-segmented labium, an elongate spermatheca and 3 pairs of abdominal spiracles. He included *Ogeria*, *Pachyplagia*, *Luachimonannus* Wygodzinsky (1950), *Kokeshia* (Esaki & Miyamoto, 1959) and *Chinannus* (Wygodzinsky, 1948).

In the context of his definitive interpretation of schizopterid venation, Emsley remarked that the venation of all the genera is fully comparable. *Kaimon* has only 2 of those characters (labium and spiracles) but appears closely allied to *Ogeria* in general structure. Although Wygodzinsky's descriptions of *Luachimonannus* and *Chinannus* omit or contradict some of the above definition, Emsley supplied new observations of these taxa to support his classification. However, Hill (1990b) failed to find a spermatheca in *Ogeria* and figured that of *Pachyplagia* (Hill, 1990a) as less elongate than the original drawing (Emsley, 1969) although the dilate duct raises uncertainty in delimiting the spermatheca. Hill also found that 4 or 5 veins emanate from the trapezoidal cell in various species of *Ogeria* and *Pachyplagia* although 5 is more common. *Kaimon* is here placed in the Ogeriinae because of its similarity to *Ogeria.*

The concept of Ogeriinae awaits reconsideration. This will be easier when 2 new genera from Fiji are described. A cursory examination of Schizopteridae collected by Queensland Museum in Fiji revealed 2 undescribed ogeriine genera and *Ogeria*. One genus is slightly larger than Fijian *Ogeria*, has trimerous, slender tarsi in both sexes, no pronotal collar and the anal aperture of females lies immediately inside the submarginal carina of T9 and has a distinctive, hooded profile. The other genus is larger, has trimerous, slender tarsi in both sexes, a pronotal collar and the anal aperture of females lies immediately outside the submarginal carina of T9 and is not hooded. Both undescribed genera appear to have a transverse sclerotised plate, reminiscent of *Pachyplagia*, for posterior gonapophyses. Only submacropterous and brachypterous morphs of both sexes were seen so that the number of veins emanating from the trapezoidal cell cannot be known. Both genera had a four-segmented labium that was incrassate subapically in contrast to *Ogeria*.

KEY TO AUSTRALIAN SPECIES OF *KAIMON* USING NON MACROPTEROUS MALES

1. Vertex simple, SQ and NSW only 2
   Vertex with pit or U slit 4
2. Pronotal disc weakly flattened anteromedially (Fig. 9A-C) . . . . . *plistonotius* sp. nov.
   Pronotal disc clearly flattened anteromedially (Fig. 9D-I) 3
3. Vertex paler medially than laterally *mesambrinus* sp. nov.
   Vertex concolourous . . . . . *bulburinensis* sp. nov.
4. Vertex with U-slit, SQ and CQ, (Fig. 8H-L) 5
   Vertex with pit, NQ, (Figs 7A-L, 8A-G) 9
5. Pronotal disc overhanging vertex (Fig. 6I) *kroombitensis* sp. nov. . . . . .
   Pronotal disc not overhanging vertex. 6
6. Genital capsule with hooked spinous process, pronotal disc undulating, flat, posterior margin rolled (Fig. 6H) . . . . . *eungellanus* sp. nov.
   Genital capsule without hooked process, pronotal disc without three undulations, posterior margin not rolled 7
7. Small flat area anteromedially on pronotal disc, pronotal disc strongly convex anteriorly and with single undulation, weakly sinuous posteriorly in profile (Fig. 6J) . . . . . *alleungellanus* sp. nov.

Large flat or shallowly concave area anteromedially on pronotal disc, pronotal disc less convex and without undulation (Fig. 6K-L) 8

8. Lateral margins of pronotal disc parallel (Fig. 4K), not dilate (Fig. 6K), left paramere 0.131mm . . . . . long*notipolysperes* sp. nov.

Lateral margins of pronotal disc convergent (Fig. 4L), dilate (Fig. 6L), left paramere 0.098mm long . . . . . *byfieldensis* sp. nov.

9. Anterior rim of pit depressed, merging anteriorly with broad impression or longitudinal furrow anterior to pit (Fig. 3A-E). 10

Anterior rim of vertex pit sharply defined, sometimes raised, occasionally minutely notched medially, vertex not broadly impressed or longitudinally sulcate anterior to pit (Figs 3F-L, 4A-G) 14

10. Lateral margins of pronotal disc convergent (Fig. 3A,B) 11

Lateral margins of pronotal disc more or less parallel (posterior angles may be tumid) (Fig. 3C-E) 12

11. Vesica sinuous, with angular curves (Fig. 16A-C) . . . . . *epicarsius* sp. nov.

Vesica sector-shaped (Fig. 1B) . . *melanoriensis* sp. nov.

12. Lateral margins pronotal disc not dilate (Fig. 5D,E). . 13

Lateral margins pronotal disc dilate (humeral angle tumid but disc margins otherwise parallel in dorsal view) (Fig. 5C). . . . . *thorntonensis* sp. nov.

13. Pronotal disc flat posteromedially, posterior margin truncate medially, vertex broadly impressed (Figs 3E, 7E). . . . . *carbinensis* sp. nov.

Pronotal disc weakly convex posteromedially, posterior margin smoothly convex, vertex narrowly impressed (Figs 3D, 7D) . . . . . *macdowallensis* sp. nov.

14. Vertex pit lip raised (Figs 5G, 6C, 6G) 15

Vertex pit lip flush (Figs 5H-L, 6A,B,D-F) 17

15. Lateral margins of pronotal disc parallel (Fig. 4G) . . . . . *leeiensis* sp. nov.

Lateral margins of pronotal disc convergent (Figs 3G, 4C) 16

16. Posterior margin of pronotal disc concave (Fig. 4C) . . . . . *webbensis* sp. nov.

Posterior margin of pronotal disc convex (Fig. 3G) . . . . . *baroalbaensis* sp. nov.

17. Lateral margins of pronotal disc parallel (Figs 3H,L, 4A-B) 18

Lateral margins of pronotal disc not parallel (Figs 3F,I-K, 4D-F) 21

18. Micropterous, forewings reaching T3. *micropterus* sp. nov.

Submacropterous, fore wings reaching apex of abdomen 19

19. Rim of vertex pit circular in dorsal view, lateral margins of pronotal disc not dilate (Figs 3H, 5H) . . . . . *finniganensis* sp. nov.

Rim of vertex pit triangular in dorsal view, lateral margins of pronotal disc dilate (Figs 3L, 4A, 5L, 6A) 20

20. Rim of vertex with notch anteromedially, strong intrusion of pronotal disc into pit (Fig. 4A) . *conwayensis* sp. nov.

Rim of vertex pit not notched, no intrusion of pit into pronotal disc (Fig. 3L). . . . . *allonesioticus* sp. nov.

21. Pronotal disc undulate (Fig. 6E) . *athertonensis* sp. nov.

Pronotal disc not undulate (Figs 5F,I-K, 6D,F) 22

22. Pronotal disc convex immediately above vertex pit (Fig. 7F) . . . . . *sidereoriensis* sp. nov.

Pronotal disc flat or concave immediately above vertex pit (Figs 7I-K, 8D,F) 23

23. Lateral margins of pronotal disc and humeral angle dilate (Figs 3I, 5I) . . . . . *polysperes* sp. nov.

Lateral margins of pronotal disc and humeral angle not dilate (Figs 3J-K, 4D,F) 24

24. Forewing concolourous . . . . . *lambensis* sp. nov.

Forewing with pale band or at least one pale basal cell. . 25

25. Vertex pit V-shaped in anterior view (Fig. 7K), pronotal disc sulcate above pit . . . . . *ancylonesioticus* sp. nov.

Vertex pit U-shaped in anterior view (Fig. 8D,F), pronotal disc broadly concave above pit. 26

26. Intrusion of pronotal disc into pit flattens, becomes horizontal, humeral angles tumid (Fig. 4D) . . . . . *pismaensis* sp. nov.

Intrusion of pronotal disc inclined in pit, not flattening, humeral angles barely tumid (Fig. 4F) . . . . . *allomelanoriensis* sp. nov.

Kaimon alleungellanus sp. nov.
(Figs 4J, 6J, 8J, 10E, 10H, 18B, Tables 2, 3)

ETYMOLOGY. Greek *allos*, other; 'other of Eungella' alludes to the shared distribution with *K. eungellanus*.

MATERIAL. TYPES. Holotype. T.108863: sub. ♂, Broken River, Eungella NP, 21°11'S 148°31'E, 700m, Monteith, 18 Apr 1979, OFSLB-QM35, carded ex ethanol, in QM. Paratypes: as for holotype, 1 sub. ♂, slide and vial, in QM. OTHER MATERIAL. Finch Hatton Gorge, 21°04'S 148°38'E, 470m, A. Gillison, 18 Nov 1981, 1 ♀; Finch Hatton Gorge, 21°04'S 148°38'E, 300m, A. Gillison, 18 Nov 1981, 1 sub. ♂; in ANIC. Palm Lookout, Eungella, 21°10'S 141°31'E, 700m, Monteith, 18 Apr 1979, 1 sub. ♂; in QM.

DESCRIPTION. *Submacropterous Male.* General colour brown, posterior quarter of disc lighter brown, vertex lobe yellow-brown. Vertex without pit but with U-shaped, slightly elevated yellowish brown lobe bounded by U slit.

Pronotal disc with small flat area adjacent to vertex lobe; disc in profile convex and decurved anteriorly, flat posteriorly, not concurvilinear with anterior profile; humeral angles not tumid; lateral margins parallel, not dilate. Metapleurae not prominent in dorsal view.

Forewings not paler proximally, 3 free veins subapically.

T1 microganulate. Posterior margin S6 simple. Right posterior angle S7 broadly and strongly projecting posteriorly, discs S5-7 with large, strongly depressed area submedially on right. Genital capsule without tumescence on right posterior angle; left paramere 0.114mm. Conjunctival sclerites of aedeagus with short spinous process much shorter than basal plate

(Fig. 18B). Vesica single, incomplete loop, simple apex, no branch.

Female. Venation light brown, 1 cream, closed cell.

DISTRIBUTION. 3 localities in CQ at 300-700m. *K. eungellanus* and *K. conwayensis* also occur in CQ. Females from 3 series without males (swamp and sclerophyll palm forests, 6.5km SSE Eungella, 800 m) may be this species or *K. eungellanus*.

NOTES. Macropterous male unknown. Collected in open, vine and rain forest litter and stick brushing berlesates.

Kaimon allomelanoriensis sp. nov.
(Figs 1A, 1C, 1D, 4F, 6F, 8F, 14M, 19D, Tables 2, 3)

ETYMOLOGY. Greek *allos*, other; 'other from black mountain', refers to the shared distribution in the Black Mountain Corridor region with *K. melanoriensis*.

MATERIAL. TYPES. Holotype: sub. ♂, Black Mtn Rd, 30km N Kuranda, J.G. Brooks, 4 Nov 1969, RFLB-ANIC165, carded (sympatric in mount with paratype male of *K. melanoriensis*), in ANIC. Paratype: as for holotype, 2 sub. ♂, on multiple mount with holotype of *K. melanoriensis*, in ANIC. OTHER MATERIAL. Black Mtn Rd, 11km N Kuranda, Turkey Pocket, 30 Oct 1969, J.G. Brooks, 1 sub. ♂, 3 ♀, in ANIC.

DESCRIPTION. *Submacropterous Male.* General colour dark reddish brown, vertex with pale rim. Curvature of frons flattened; vertex pit in dorsal view pear-shaped, posterior margin formed by sharply excavate (or squarely incised) anteromedial margin of disc; in anterior view wide V- to arc-shaped, ridge and arch embracing ridge visible, anterior margin with acutely defined rim, not depressed, no depression anterior to pit, apex of pear-shaped pit formed between points of disc intrusion, medial ridge of pit broad, depressed and disjunct from anterior rim of pit; outer rim superior to intruding points of disc.

Pronotal disc embracing pit ridge, line between points of protrusion into pit concave with square notch in views perpendicular to disc and whole body axis. Disc protrusion inclined, not becoming horizontal apically; disc weakly concave above vertex pit; convex anteriorly and strongly decurved in lateral view, not concurvilinear with head profile; weakly convex-flat posteriorly but concurvilinear with anterior profile; humeral angles barely tumid; lateral margins weakly convergent in dorsal view, not dilate. Metapleurae not prominent in dorsal view.

Forewings variably pale proximally, in repose forming pale transverse band on body or merely a pale costal vein, 2 free veins subapically.

T1 granulate. Posterior margin S6 simple (Fig. 14M). Disc of S7 with very weak impression submedially and weak tumescence adjacently on right. Genital capsule with distinct tumescence on right posterior angle (Fig. 14M); left paramere long, 0.212mm. Conjunctival sclerites of aedeagus probably lacking spinous process. Vesica sinuous, not looped, vesica with subapical tooth; vesica with subequal, sinuous branch arising beyond midlength, branch apex simple

Female. See notes for *K. melanoriensis*. The females of the Turkey Pocket series listed as additional material and not sympatric in series with *K. melanoriensis* are brown, have 1-2 cream, closed, forewing cells and light brown to brown venation which is typical of many species.

DISTRIBUTION. From 2 rainforest sites 19km apart in the Black Mountain Corridor at unknown altitude. It is sympatric with *K. melanoriensis* at the type locality for both species.

NOTES. Macropterous male unknown. Collected in rainforest litter berlesates.

Kaimon allonesioticus sp. nov.
(Figs 3L, 5L, 7L, 17F, Tables 2-3)

ETYMOLOGY. Greek *allos*, other, *nesiotes*, islander; alluding to its sympatry with *K. ancylonesioticus*.

MATERIAL. TYPES. All in QM. Holotype T108857: sub. ♂, Gayundah Ck, Hinchinbrook I., 18°22'S 146°13'E, 80m, Monteith, Davies, Thompson & Gallon, 12 Nov 1984, RFSLB-QM669, carded. Paratypes: as for holotype, 1 sub. ♂ and 8 ♀ in 1 vial, 1 sub. ♂ on 1 slide, 1 ♀ carded, 1 ♀ cleared in vial.

DESCRIPTION. *Submacropterous Male.* General colour brown, vertex paler. Vertex pit in dorsal view roundly triangular, posterior margin formed by truncate apex of protruding disc margin; pit roundly V-shaped in anterior view, arch of disc protrusion embracing ridge visible, ridge not visible; anterior margin of pit not depressed, no depression anterior to pit, pit with acutely defined rim; medial ridge of pit recessed, disjunct from anterior rim of pit; curvature of frons weakly convex.

Pronotal disc flattened above vertex pit, inclining into pit but not notched or embracing pit ridge, apex of protrusion squarely truncate (without points), inferior to rim of pit; disc

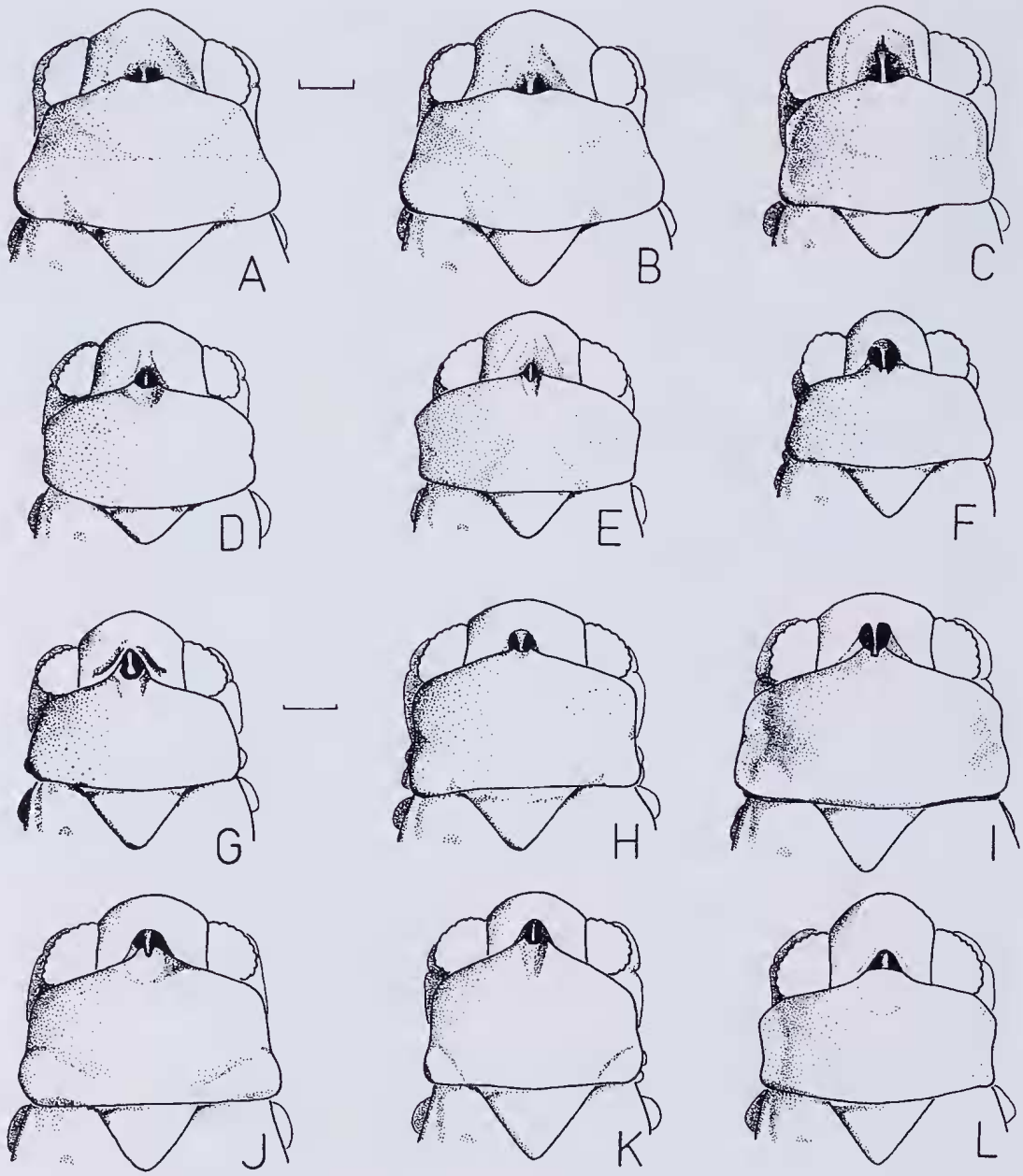

FIG. 3. Submacropterous ♂♂, anterior half, dorsal. A, *K. epicarsius*; B, *K. melanoriensis*; C, *K. thorntonensis*; D, *K. macdowallensis*; E, *K. carbinensis*; F, *K. sidereoriensis*; G, *K. baroalbaensis*; H, *K. finniganensis*; I, *K. polysperes*; J, *K. lambensis*; K, *K. ancylonesioticus*; L, *K. allonesioticus*. Scale lines 0.1mm.

convex anteriorly, weakly decurved in lateral view, concurvilinear with head profile; flat posteriorly and concurvilinear with anterior profile; humeral angles barely tumid; lateral margins roughly parallel but constricted at midlength in dorsal view, disc in dorsal view widest anteriorly, lateral margins dilate; posterior margin convex. Mesopleurae prominent in dorsal view.

Forewings entirely pale; 2 free veins subapically.

T1 carinulae in form of vestigial triangles, not clearly carinulate or granulate. Posterior margin S6 simple but S5 with minute, protruding ledge on right near midline. Disc of S7 with small impression submedially and distinct tumescence sublaterally on right reaching posterior margin, posterior margin weakly projecting on right. Genital capsule simple, right posterior corner with broad, illdefined tumescence; left paramere 0.139mm. Conjunctival sclerites of aedeagus lacking spinous process. Vesica biramous incomplete, spiralled loop, apex simple; vesica with subequal, branch arising distally, branch apex simple.

Female. Light brown, forewing with 1-2 cream, closed cells, veins light brown; pronotal and cibarial muscle scars dark.

DISTRIBUTION. Hinchinbrook Island at 80m compared to 10m for *K. ancylonesioticus*.

NOTES. Macropterous male unknown. Collected in a litter berlesate from rainforest.

Kaimon ancylonesioticus sp. nov.
(Figs 3K, 5K, 7K, 17E, 19I, Tables 2-3)

ETYMOLOGY. Greek ankylos, hooked, *nesiotes*, islander; referring to the hooked vesical apex and distribution on Hinchinbrook Island.

MATERIAL. TYPES. All in QM. Holotype T108856: sub. ♂, Gayundah Ck, Hinchinbrook I., 18°22'S 146°13'E, 10m, Davies, Thompson & Gallon, 9 Nov 1984, RFSLB-QM663, carded ex ethanol. Paratypes: as for holotype, 3 sub. ♂ and 11 ♀ in ethanol vial, 1 sub. ♂ carded, 2 ♀ carded, 1 sub. ♂ in 3 slides and 1 vial, 1 ♀ cleared and dissected in vial. OTHER MATERIAL. Gayundah Ck, Hinchinbrook I., 18°22'S 146°13'E, 10m, MT, 8-15 Nov 1984, 8 sub. ♂, 4 ♀, in 3 series, in QM.

DESCRIPTION. *Submacropterous Male*. General colour dark brown, vertex concolourous. Vertex pit in dorsal view roundly triangular, posterior wall formed by squarely emarginate protrusion of disc, V-shaped in anterior view, ridge barely visible but arch of disc protrusion embracing disc visible, anterior margin with acutely defined rim, not depressed, no depression anterior to pit, curvature of frons weakly flattened, medial ridge of pit recessed and disjunct from anterior rim of pit, lateral portions of pit rim superior to intruding points of disc.

Pronotal disc embracing but not touching pit ridge in dorsal and anterior views, points of anteromedial disc margin protruding into pit laterally, line between points of protruding disc squarely concave in views dorsal to disc and body axis; disc protrusion with sulcate incline into vertex pit; disc otherwise convex anteriorly and decurved in lateral view but concurvilinear with head profile; weakly convex posteriorly and concurvilinear with anterior profile; humeral angles tumid; lateral margins more or less parallel in dorsal view but appearing weakly convex if tumid angles considered, lateral margins not dilate. Metapleurae prominent in dorsal view.

Forewings entirely pale proximally; two free veins subapically.

T1 carinulate. Posterior margin S6 simple. Disc of S7 with small impression submedially on right bordered by weakly raised areas, posterior margin weakly projecting on right. Genital capsule with acute tumescence on right posterior angle; left paramere 0.147mm. Conjunctival sclerites of aedeagus lacking spinous process. Vesica not forming a loop, vesical apex simple; vesica with longer, sinuous, recurved branch, apex of branch minutely incised.

Female. Light brown, forewing with 2 cream, closed cells, veins light brown; pronotal and cibarial muscle scars dark.

DISTRIBUTION. Hinchinbrook Island at 10m compared with 80m for the next species, *K. allonesioticus*. Specimens examined late in this study from Mt Cleveland near Townsville in the Elliot Upland region are this or a closely allied species.

NOTES. Macropterous male unknown. Three series of females from Gayundah Creek, 10m not associated with males may be this species or the next. Collected in litter berlesates, flight intercept traps and yellow pan traps in rain forest.

Kaimon athertonensis sp. nov.
(Figs 4E, 6E, 8E, 17G, 19K, Tables 2, 3)

ETYMOLOGY. From the Atherton Uplands region.

MATERIAL. TYPES. Holotype. T108860: sub. ♂, Mt Fisher, 7km SW Millaa Millaa, 17°34'S 145°34'E, 1100m, Monteith, Yeates, Cook, 27 Apr 1982, RFSLB-QM409, carded, in QM. Paratypes: as for holotype, 1 sub. ♂ and 1 ♀ in vial, 1 sub. ♂ carded, 1 sub. ♂ in 1 slide and vial, 1 ♀ in 1 slide and vial, in QM. OTHER MATERIAL. Mt Fisher, 7km SW Millaa Millaa, 1050-1100m, MYC, 27-29 Apr 1982, 4 sub. ♂, 1 ♀, in 3 series (sympatry in 1 series with 1 mac. ♂ *K. polysperes*); Mt Fisher (Kjellberg), 17°32'S 145°33'E, 1100m, Monteith, 17 May 1995, 1 sub. ♂, 8 ♀ (sympatric in series with 1 mac. ♂ *K. polysperes*); in QM.

DESCRIPTION. *Submacropterous Male*. General colour brown, vertex concolourous.

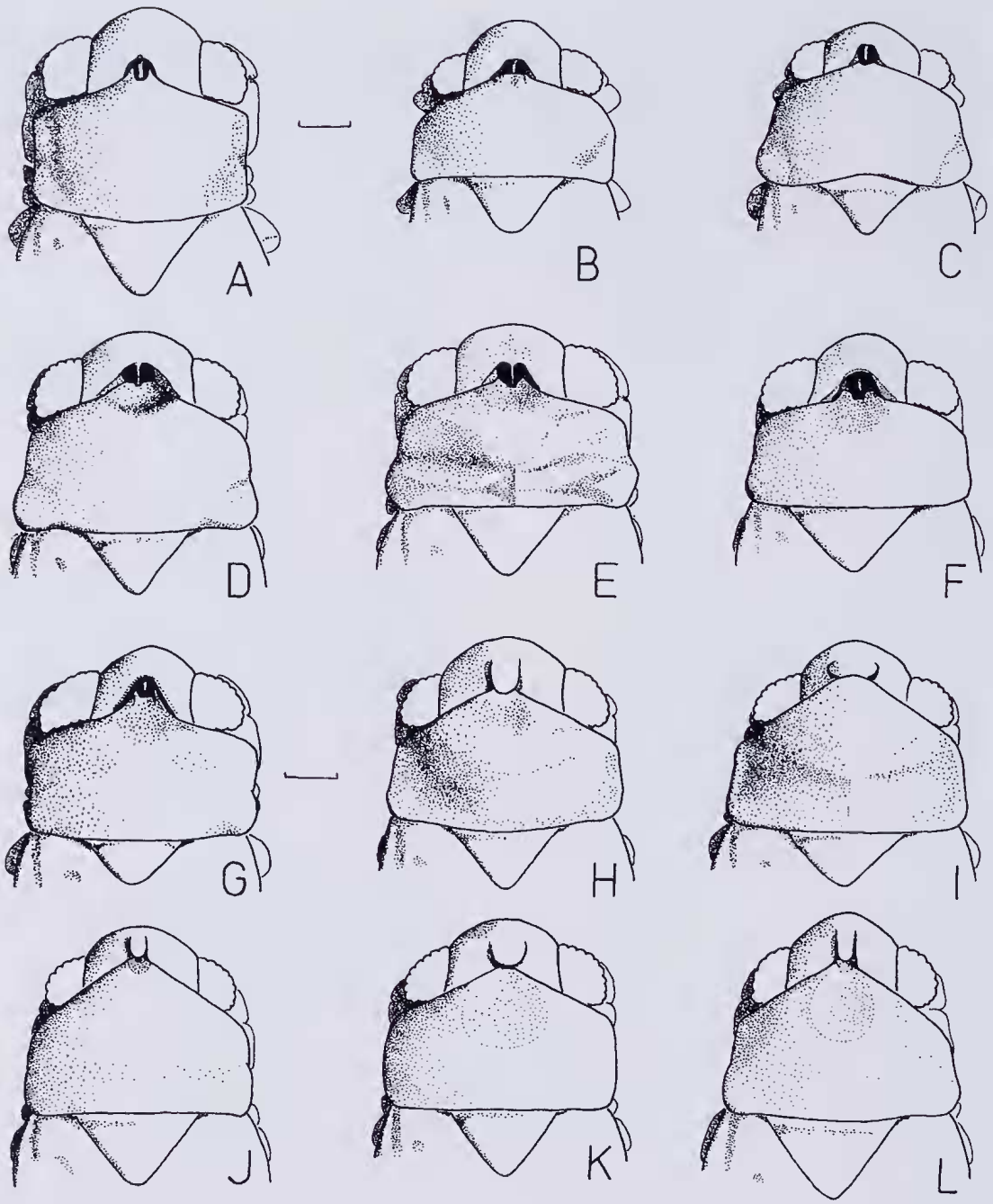

FIG. 4. Submacropterous ♂♂, anterior half, dorsal. A, *K. conwayensis*; B, *K. micropterus*; C, *K. webbensis*; D, *K. pismaensis*; E, *K. athertonensis*; F, *K. allomelanoriensis*; G, *K. leeiensis*; H, *K. eungellanus*; I, *K. kroombitensis*; J, *K. alleungellanus*; K, *K. notipolysperes*; L, *K. byfieldensis*. Scale lines 0.1mm.

Frons strongly flattened (Fig. 6E); vertex pit in dorsal view heart-shaped, posterior wall formed by flat, steeply inclined protrusion of disc, in anterior view arc-shaped, ridge and minute arch embracing ridge visible, anterior margin not depressed, anterior margin with acutely defined

rim, vertex not depressed anteriorly to pit, medial ridge of pit flush with rim and confluent with anterior rim of pit.

Pronotal disc loosely embracing pit ridge in dorsal view, points between V-shaped, emarginate anterior margin of protrusion concave in views perpendicular to disc and whole body axis and confluent with inner vertex pit rim in anterodorsal view; flat above vertex pit; anteriorly with transverse ridge rising to a central hump, anterior face parallel to profile of flat frons, posteriorly with transverse ridge, gutter separating major transverse ridges interrupted by medial, minor, longitudinal ridge; humeral angles tumid but merging with posterior, transverse ridge; lateral margins otherwise parallel in dorsal view, not dilate. Metapleurae not prominent in dorsal view.

Forewings paler proximally, in repose forming pale transverse band on body; 2 free veins subapically.

T1 granulate. Posterior margin S6 simple. Disc of S7 without depression, posterior margin weakly produced on right; genital capsule with weak tumescence on right posterior angle; left paramere 0.163mm. Conjunctival sclerites of aedeagus with very short spinous process much shorter than basal plate (Fig. 17G). Vesica incomplete, biramous, spiralled loop, apex with small tooth; subequal, cosinuate branch with simple apex.

Female. Venation brown, costa light brown, 1 cream, closed cell.

DISTRIBUTION. Mt Fisher in the Atherton Uplands region at 1050-1100m in rainforest where it is sympatric with *K. polysperes*.

NOTES. Macropterous male unknown. The pronotal disc is very distinctive. *K. athertonensis* is sympatric with macropterous males of *K. polysperes* in two series from Mt Fisher. The acute tumescence at the right corner of the male genital capsule of a macropterous male (1.2mm long) in series with submacropterous males of *K. athertonensis* suggests it is *K. polysperes*. If the macropter was *K. athertonensis* then it lacks any trace of the distinctive pronotal contours of the submacropter. *K. polysperes* is known by submacropterous males from another Mt Fisher series albeit not a series containing submacropterous males of *K. athertonensis*. The frons of *K. athertonensis* is more flattened than in most species. Collected in litter and stick brushing berlesates, pitfall traps and by pyrethrum knockdown in rainforest.

Kaimon baroalbaensis sp. nov.
(Figs 3G, 5G, 7G, Tables 2-3)

ETYMOLOGY. From Baroalba Springs.

MATERIAL. ANIC. Holotype: sub. ♂, Baroalba Spring, NT, 12°47'S 132°51'E, R.W. Taylor, 20 Nov 1972, RFB-ANIC470, carded. Paratypes: As for holotype, 5 ♀.

DESCRIPTION. *Submacropterous Male*. General colour light brown, vertex concolourous. Vertex pit roughly triangular in dorsal view, ill-defined posterior wall formed by intrusive inclined disc, broadly V-shaped in anterior view, arch of disc protrusion embracing pit ridge barely visible, anterior margin well defined but rounded rather than sharply defined, not depressed or raised but appearing labiate because depressed cibarial muscle scars form pitted moat parallel to rim; medial ridge of pit recessed and disjunct from anterior rim of pit.

Pronotal disc projecting into pit, embracing pit ridge in dorsal view; weakly impressed above pit; convex anteriorly and decurved in lateral view, not concurvilinear with vertex profile; flattening posteriorly but concurvilinear with profile of anterior disc; humeral angles not tumid but dilate; lateral margins convergent in dorsal view, not dilate. Metapleurae prominent in dorsal view.

Forewings not paler proximally; two veins subapically. Posterior margin S6 with long, narrow ledge. S7 impressed submedially on right but no adjacent tumescence, posterior margin weakly projecting on right. Genital capsule simple, right posterior corner without distinct tumescence; left paramere and conjunctival sclerites of aedeagus unknown. Vesica looped, vesical apex simple; vesical branch unknown.

Female. Colour generally light brown, forewings concolourous, 1 cream, closed cell.

DISTRIBUTION. From the Northern Territory.

NOTES. Macropterous male unknown. Known from 1 submacropterous male and 5 females. No slides were prepared for this description. Collected in a rain forest litter berlesate.

Kaimon bulburinensis sp. nov.
(Fig. 9F-H, Tables 2, 3)

ETYMOLOGY. From the Bulburin region.

MATERIAL. TYPES. Holotype. T108867: sub. ♂, Forest Station, Bulburin SF via Many Peaks, 2000 feet, Monteith, 2-5 Apr 1972, in QM. Paratypes: 2 ♀, on card mount with holotype, in QM.

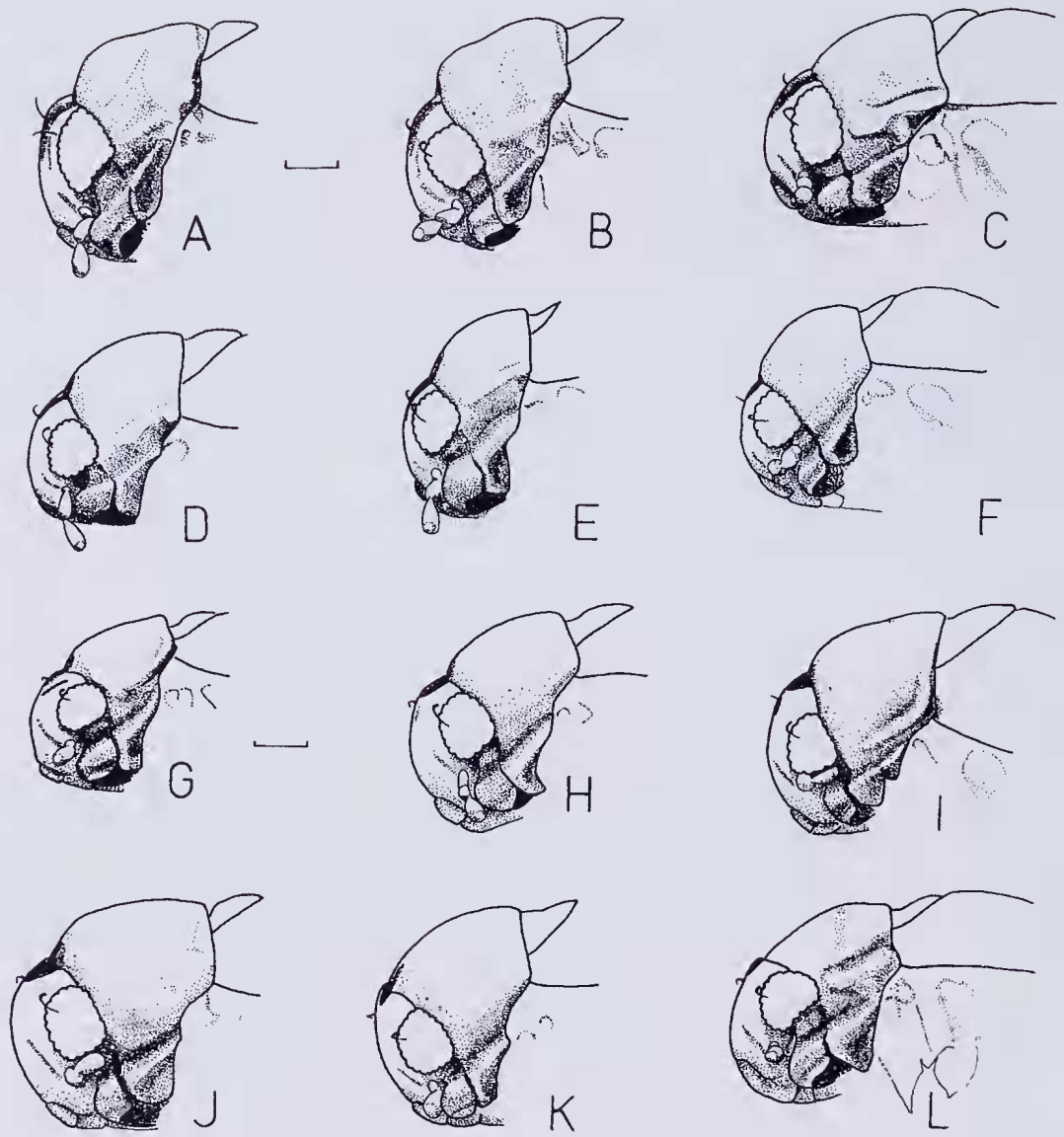

FIG. 5. Submacropterous ♂♂, anterior half, left lateral. A, *K. epicarsius*; B, *K. melanoriensis*; C, *K. thorntonensis*; D, *K. macdowallensis*; E, *K. carbinensis*; F, *K. sidereoriensis*; G, *K. baroalbaensis*; H, *K. finniganensis*; I, *K. polysperes*; J, *K. lambensis*; K, *K. ancylonesioticus*; L, *K. allonesioticus*. Scale lines 0.1mm.

DESCRIPTION. *Submacropterous Male.* General colour dark brown, posterior quarter disc lighter brown, vertex with faint pale triangle medially, costa not yellow-brown but claval and sutellum margins yellow brown. Vertex without pit or lobe, perhaps a vestigial depression, narrow posterior area in profile colinear with pronotal disc but abruptly decurving anteriorly to frons.

Pronotal disc flattened adjacent to vertex pit vestige; anterior margin in dorsal view strongly deviating from straight line; disc in profile straight anteriorly and weakly convex posteriorly; humeral angles weakly tumid; lateral margins weakly convergent, not dilate. Metapleurae prominent in dorsal view.

Forewings without pale band proximally, 3 free veins subapically.

T1 unknown. Posterior margin S6 simple. Right posterior angle S7 broadly and strongly projecting posteriorly, discs S5-7 with large, strongly depressed area submedially on right. Genital capsule with broad, rounded tumescence on right posterior angle; left paramere unmeasured. Conjunctival sclerites of aedeagus unknown. Vesica forming single spiralled loop, apex simple, no branch.

Female. Venation brown, 1 cream closed cell, clavus with small, yellow-brown patch.

DISTRIBUTION. 1 locality in SQ at 650m. The closest congener is *K. kroombitensis* at Kroombit Tops.

NOTES. Macropterous male unknown. Collecting method and habitat unknown.

Kaimon byfieldensis sp. nov.
(Figs 4L, 6L, 8L, 18D, Tables 2, 3)

ETYMOLOGY. From the Byfield region.

MATERIAL. TYPE. Holotype. T108865: sub. ♂, Nob Creek, Byfield, 23°52'S 150°37'E, Monteith, 27 Apr 1979, RFSLB-QM72, carded ex ethanol, in QM. Paratypes: as for holotype, 3 ♀ (1 ♀ on 2 slides plus vial, other 2 ♀ in another vial). OTHER MATERIAL. Nob Creek, Byfield, 23°52'S 150°37'E, Monteith, 27 Apr 1979, 1 sub. ♂, 1 ♀ in 2 series; in QM.

DESCRIPTION. *Submacropterous Male.* General colour dark brown, vertex paler. Vertex without pit but with U-shaped, slightly elevated lobe bounded by U slit.

Pronotal disc with large concave area adjacent to vertex lobe; disc in profile barely inflated, weakly convex anteriorly and posteriorly; humeral angles weakly tumid; lateral margins anterior to humeral angles convergent and dilate. Metapleurae not prominent in dorsal view.

Forewings not paler proximally, 3 veins subapically.

T1 microganulate. Posterior margin S6 simple. Right posterior angle S7 broadly and strongly projecting posteriorly, discs S5-7 with large, strongly depressed area submedially on right. Genital capsule with distinct tumescence on right posterior angle; left paramere 0.098mm. Conjunctival sclerites of aedeagus with short spinous process much shorter than basal plate (Fig. 18D). Vesica single loop, simple apex, no branch (Fig. 18D).

Female. Posterior quarter of disc lighter brown than remainder of body, veins brown, 2 closed, cream cells.

DISTRIBUTION. 1 locality in CQ, remote from rainforest.

NOTES. Macropterous male unknown. Collected in rain forest litter and stick brushing berlesates.

Kaimon carbinensis sp. nov.
(Figs 3E, 5E, 7E, Table 2)

ETYMOLOGY. From the Carbine Uplands region.

MATERIAL. HOLOTYPE. T108853: sub. ♂, Mossman Gorge, 16°25'S 145°20'E, Monteith, 20 Oct 1982, RFSLB-QM263, carded ex ethanol, in QM.

DESCRIPTION. *Submacropterous Male.* General colour dark brown, vertex concolourous. Vertex pit diamond-shaped with posterior apex formed by sharply excavate anteromedial margin of disc in dorsal view. Anterior margin of vertex pit depressed, vaguely defined, V-shaped in anterior view, without notched apex, merging with narrow, shallow gutter diminishing towards frons. Medial ridge of pit recessed and disjunct with anterior margin of pit.

Anteromedial margin of pronotal disc forming posterior margin of vertex pit in dorsal view, points of sharply excavate margin confluent with depressed rim of vertex pit (forming posterior apex of diamond-shaped pit), embracing pit ridge in anterior but not dorsal view; anteromedial disc sulcate immediately above vertex pit; convex anteriorly and strongly decurved, not concurvilinear with vertex profile; flat posteromedially but smoothly continuous with anterior area; lateral margins in dorsal view roughly parallel, disc widest at about 0.25 from anterior margin, narrowest medially; lateral margins of disc not dilate; humeral angles not tumid; pronotal muscle scars depressed. Metapleurae not prominent in dorsal view.

Forewings not paler proximally; 2 free veins subapically.

T1 unknown. S6 margin simple. S7 lacking contiguous depression and tumescence on right, posterior margin weakly projecting on right. Genital capsule, left paramere and conjunctival sclerites of aedeagus unknown; vesica and concurved branch forming incomplete loop, vesica with subequal branch arising before midlength, apex of vesica or its branch bifid, other not.

DISTRIBUTION. One site in the Carbine Uplands region as one of 4 species in this region. Topotypic sympatry with one of the 2 widespread macropterous species of the Wet Tropics (Table

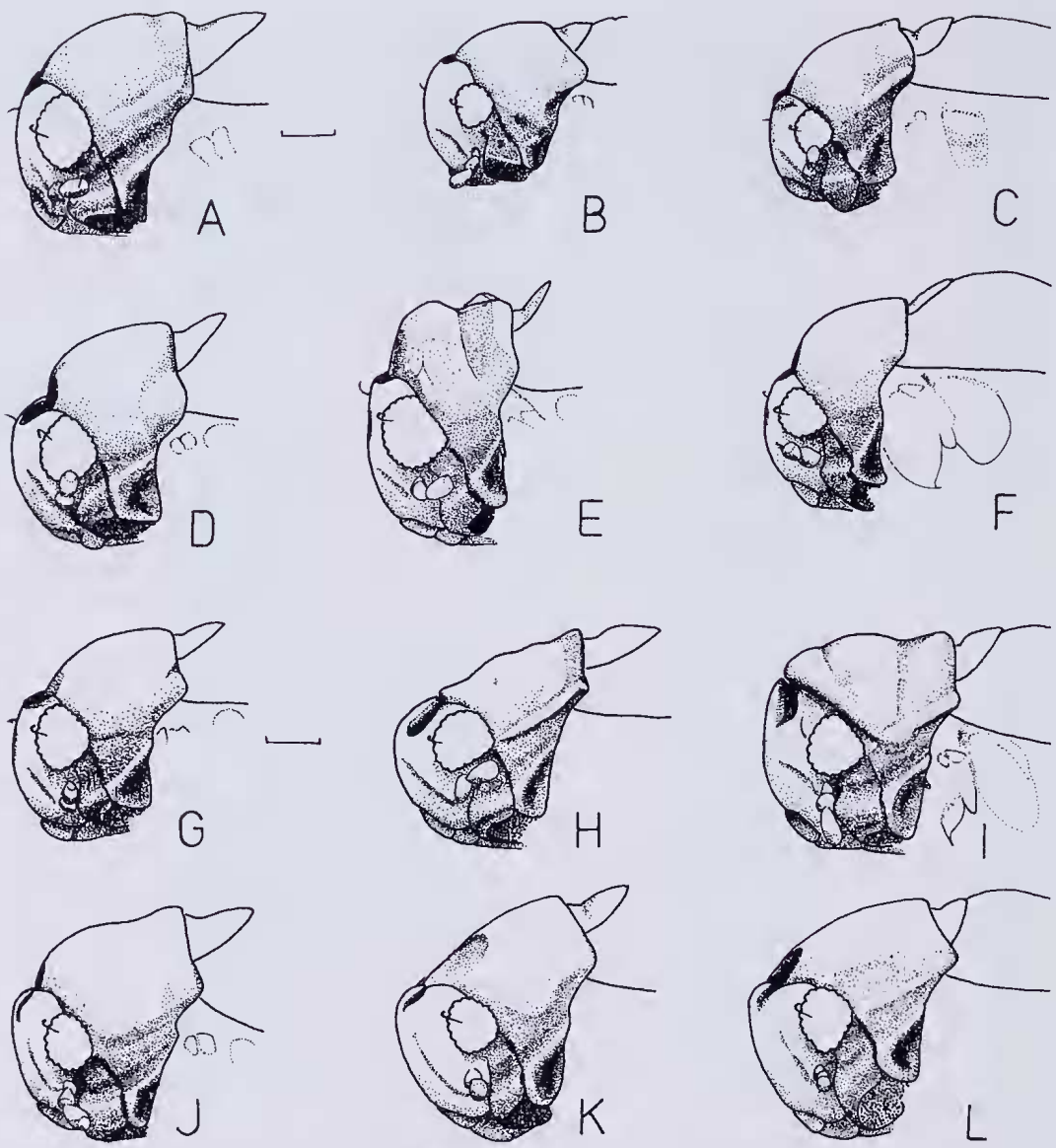

FIG. 6. Submacropterous ♂♂, anterior half, left lateral. A, *K. conwayensis*; B, *K. micropterus*; C, *K. webbensis*; D, *K. pismaensis*; E, *K. athertonensis*; F, *K. allomelanoriensis*; G, *K. leeiensis*; H, *K. eungellanus*; I, *K. kroombitensis*; J, *K. alleungellanus*; K, *K. notipolysperes*; L, *K. byfieldensis*. Scale lines 0.1mm.

4) is likely. *K. micropterus* occurs at another site adjacent to the Carbine Uplands region

NOTES. Female and macropterous male unknown. A solitary female in series with holotype was unusually large (male LB 82% of female LB) and is not regarded as conspecific. It has suitable dimensions (LB 0.95, LHT 0.45, WP 0.50, LP 0.21, DAE 0.41mm) to be either of the widespread macropterous species, *K. epicarsius* or *K. polysperes*, both of which occur in the Carbine Uplands region.

K. carbinensis has a similar vertex furrow anterior to the pit as in *K. thorntonensis* but it lacks a notched apex (Fig. 7C,E). The pronotal disc protrudes more into the pit to embrace the pit ridge creating a diamond-shaped rather than circular pit in dorsal view (Fig. 3C,E). The disc is

wider anteriorly and flat posteromedially in *K. carbinensis* rather than smoothly convex as in *K. thorntonensis* and *K. macdowallensis*.

Kaimon conwayensis sp. nov.
(Figs 4A, 6A, 8A, 16H, Tables 2-3)

ETYMOLOGY. From the Conway Range region.

MATERIAL. TYPES. All in QM. Holotype. T108858: sub. ♂, Brandy Ck, Conway SF, 20°20'S 148°42'E, 60m, Monteith, 23 Apr 1979, RF stick brushing B-QM56, carded. Paratypes: as for holotype, 2 ♀ in vial, 1 ♀ cleared in vial, 1 ♀ carded. OTHER MATERIAL. Brandy Ck, Conway SF, 20°20'S 148°42'E, 60m, Monteith, 23 and 25 Apr 1979, 1 sub. ♂, 1 ♀ in 2 series, in QM.

DESCRIPTION. *Submacropterous Male.* General colour dark blackish brown, vertex concolourous. Vertex pit in dorsal view like pointed arch, posterior wall sinuate, formed by deeply emarginate protrusion of disc, V-shaped in anterior view, arch in disc protrusion visible, ridge not visible; anterior margin not depressed, acutely defined, faintly upcurved except medially (creating notched effect in some views); vertex not depressed anteriorly to pit, medial ridge of pit recessed, obscure, disjunct from anterior rim of pit.

Anteromedial margin of pronotal disc projecting into vertex pit as two, salient points, in dorsal view forming acute posterior apex to pit rather than arc-shaped posterior wall, line between points of protruding disc deeply concave in views dorsal to disc and body axis; disc weakly sulcate above vertex pit; convex anteriorly and weakly decurved in lateral view, concurvilinear with head profile; flat posteriorly and slightly depressed; humeral angles tumid; lateral margins roughly parallel but constricted at midlength in dorsal view, dilate. Mesopleura prominent in dorsal view.

Forewings probably not pale proximally (specimen stained by blue label dye); 2 free veins subapically.

T1 granulate. Posterior margin S6 simple. Disc of S7 with small impression submedially and weak tumescence sublaterally on right reaching posterior margin, posterior margin weakly projecting on right. Genital capsule with large, acute tumescence on right posterior angle; left paramere 0.171mm. Conjunctival sclerites of aedeagus lacking spinous process. Vesica spiralled-looped, vesical apex perhaps notched; with subequal, concurved branch arising near midlength, branch apex simple.

Female. Veins brown, 1 cream, closed, cell, spermatheca oblong.

DISTRIBUTION. CQ at 60m. Females not associated with males in 2 series from Mt Dryander (RF, 575m) and Cannon Vale (RF, 10 m) probably belong to this species but could be *K. eungellanus* or *K. alleungellanus* which occur 70-90km S in the Eungella area at 200-700m.

NOTES. Macropterous male unknown. The anteroventral macroseta of the hind tibiae may lie immediately distally of the posteroventral macroseta. Collected in litter and stick brushing berlesates from rain forest including dry rain forest.

Kaimon epicarsius sp. nov.
(Figs 2A, 3A, 5A, 7A, 10A-C, 11A-D, 12C,D, 13E,F,H,I, 14A-E, 15D-F,H,I, 16A-D, Tables 2-3)

ETYMOLOGY. Greek *epi-*, over and *karsios*, crosswire, meaning 'right-angled'; alluding to the distinctive vesica.

MATERIAL. TYPES. All in ANIC. Holotype: sub. ♂, C. Tribulation area, 16°03'S 145°28'E, Calder & Weir, 21-28 Mar 1984, RF on steep slope, B-ANIC944, carded. Paratypes: as for holotype, 19 sub ♂, 13 ♀. OTHER MATERIAL. All in ANIC: Mt Sampson, 15°48'S 145°12'E, 27 Jan 1990-18 Jan 1991, 1 mac. ♂; C. Tribulation area, 16°00'-16°05'S 145°28'E, 21-28 Mar 1984, Calder & Weir, 1 mac. ♂, 16 sub. ♂, 16 ♀ in 5 series; 13km NW Kuranda, 6 Dec 1982, J. Doyen, 2 sub. ♂, 8 ♀; 1.5km E by N Mt Sorrow, 16°05'S 145°S27'E, Calder & Weir, 25 Mar 1984, 1 sub. ♂, 1 ♀; Noah Ck, 7km ENE Thornton Peak, 16°08'S 145°26'E, Calder & Weir, 27 Mar 1984, 1 sub. ♂, 5 ♀; Black Mtn Rd, 400m, Calder & Weir, 30 Mar 1984, 2 sub. ♂, 1 ♀; 2km N by E Mt Tip Tree, 17°03'S 144°37'E, 800m, Calder & Weir, 4 mac. ♂, 10 sub. ♂, 16 ♀; Josephine Falls, Mt Bartle Frere, 17°27'S 145°52'E, 10 Jul 1984, B. Halliday, 2 sub. ♂, 1 ♀; Mt Tip Tree Q, 17°03'S 145°37'E, 13 Jul 1984, B. Halliday, 1 mac. ♂, 1 sub. ♂, 3 ♀; Mt Finnigan S1, 30km S Cooktown, 400m, Peck, 1 Jul 1982, RFL and fungi B, 17 sub. ♂, 12 ♀; C. Tribulation, 40km N Daintree, 10m, Peck, 12 Jul 1982, 2 sub. ♂, 9 ♀; C. Tribulation, 10m, Peck, 15 Jul 1982, 1 sub. ♂, 1 ♀; Lake Barrine, 750m, Peck, 29 Jul 1982, 1 sub. ♂.
All in QM: Mossman Bluff, 5-10km W Mossman, 250-860m, MT/ANZSES, Jan and Dec 1988, Jan and Dec 1989, Jan 1990, 2 mac. ♂, 12 sub. ♂ in 7 series (of which 2 series sympatric with *K. polysperes*); Davies Ck, Atherton Tbld, J.H. Connell, 10 July 1970, 1 sub. ♂, 1 ♀; Bellenden Ker Range, cableway base station, 100m, EQM, 17 Oct 1981 - 9 Nov 1981, 1 mac. ♂, 1 ♀; Big Tbld 15°43'S 145°17'E, 740m, 8 Jan 1991, ANZSES, 2 mac. ♂; Big Tbld 15°43'S 145°17'E, 740m, 9 Jan 1991, ANZSES, 1 mac. ♂; Lacey's Ck, Mission Beach, 18°52'S 146°03'E, 50m, Monteith, 9 Apr 1979, 1 sub. ♂, 1 ♀; Windin Falls, NW Mt Bartle-Frere, 580m, Monteith, 9 Oct 1980, 2 mac. ♂, 14 ♀ (sympatric in series with *K. polysperes*); Lyons Lookout, Rex Highway, Mossman, 400m, Monteith &

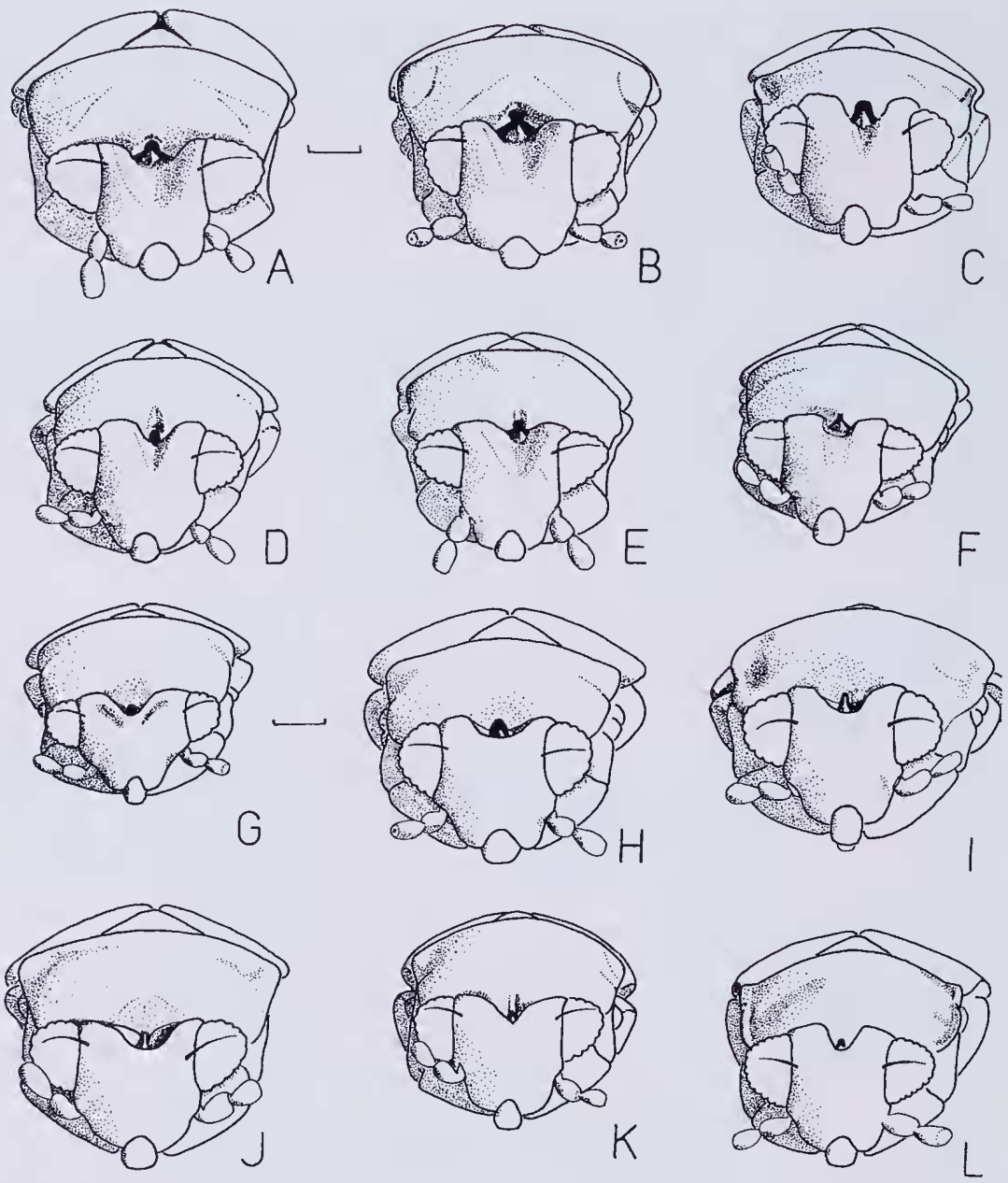

FIG. 7. Submacropterous ♂♂, anterior half, anterior. A, *K. epicarsius*; B, *K. melanoriensis*; C, *K. thorntonensis*; D, *K. macdowallensis*; E, *K. carbinensis*; F, *K. sidereoriensis*; G, *K. baroalbaensis*; H, *K. finniganensis*; I, *K. polysperes*; J, *K. lambensis*; K, *K. ancylonesioticus*; L, *K. allonesioticus*. Scale lines 0.1mm.

Cook, 13 Sep 1981, 1 mac. ♂; Russell R. at Bellenden Ker Landing, 17°16'S 145°.57'E, 5m, EQM, 1 Nov 1981, 1 mac. ♂; 1.5-3km W-NW C. Tribulation (sites 1, 2, 4 and 6), 16°05'S 145°27'-28'E, 0-500m, Sep-Oct 1982 and Jan-Apr 1983, MYT, 1 mac. ♂, 6 sub. ♂, 16 ♀ in 8 series; Boulder Ck via Tully, 18°50'S 145°54'E, 650m, MYT, 27 Oct 1983, RFSLB, 1 sub. ♂; McDowall Range, 17km N Daintree, 16°06'S 145°20'E, 520m, Monteith, 27 Nov 1985, 1 sub. ♂ (sympatric in series with *K. macdowallensis*); Black Mtn Rd, 5km N Kuranda, 16°47'S 145°38'E, 1200m, MT, 2 Dec 1988, 1 sub. ♂; Davies Ck Rd, 17°03'S 145°36'E, 750m, 17 Dec 1987,

MT, 1 mac. ♂, 2 ♀; Mt Gorton, 16°57'S 145°53'E, 750m, Janetzki, 18 Nov 1993, 1 mac. ♂; Hughes Rd, Topaz district, 17°26'S 145°42'E, 650m, Monteith & Janetzki, 5 Dec 1993, 2 sub. ♂, 3 ♀ (sympatric in series with *K. polysperes*).

DESCRIPTION. *Submacropterous Male.* General colour dark, reddish brown, vertex concolourous or occasionally paler medially.

Rim of vertex pit squarish with curved posterior margin formed by disc in dorsal view; rim ill-defined, widely opened U-shape in anterior view, pit in wide, shallow depression of vertex diminishing toward frons; medial ridge of pit recessed but confluent with anterior rim of pit.

Pronotal disc embracing ridge in vertex pit in anterior view but not intruding into pit in dorsal view, points of excavate anteromedial disc margin rounded and confluent with vertex pit rim in anterodorsal view, line between points concave in dorsal view perpendicular to disc but more or less straight in a dorsal view perpendicular to whole body axis, anteromedial face of disc convexly vertical above pit; disc convex anteriorly, sloping steeply to lateral margins, strongly decurved in lateral view, not concurvilinear with vertex profile; convex posteriorly but not coplanar with anterior section (weak discontinuity in profile); humeral angles tumid; lateral margins convergent in dorsal view, lateral margins not dilate. Metapleurae not prominent in dorsal view.

Forewings paler proximally, in repose forming pale transverse band on body (anterior vein pale proximally, dark distally, other veins dark proximally, pale medially and dark distally, cells pale proximally, dark distally, tiny costal cell dark); 2-3 free veins subapically.

T1 carinulate. S6 margin symmetrical; S7 with contiguous depression and tumescence on right near posterior margin, posterior margin weakly produced on right. Genital capsule simple, right posterior corner without distinct tumescence; left paramere 0.135-0.151mm. Conjunctival sclerites of aedeagus lacking spinous process. Vesica much longer than vesical branch, vesical branch apex with tiny, subapical, tooth; combined vesica and branch sinuous (not looped), with three right-angled bends in different planes proximally and one recurvature distally; vesica and branch diverge at first right-angle bend.

Macropterous Male. Disc similar to submacropter (vertically convex above vertex pit and anteromedially) but larger and smoothly convex in lateral view (Fig. 2A), humeral angles tumid, lateral margins convergent, not dilate; symmetry of S6, contours of S7 and genital capsule angles same as submacropter. Length fore wing 0.97mm, WP 0.60mm, LP 0.34mm, length overall 1.12mm.

Female. As in generic description; forewing cells cream, veins light brown, forewing with 0-2 closed cells (Fig. 13H-I shows 0-1 closed cells in one individual).

DISTRIBUTION. In 9 regions (Table 4) at 0-1200m altitude. It is one of 2 widespread species, the other being *K. polysperes*. Both are macropterous. 5 sympatric series were encountered. *K. epicarsius* is sympatric with *K. polysperes* at 4 localities, namely Mossman Bluff at 600m and 760m elevation, Windin Falls at 580m and Hughes Rd, Topaz District at 650m and with *K. macdowallensis* in McDowall Range at 520m. *K. epicarsius* and *K. pismaensis* occur at Bellenden Ker cableway base station at 100m but were not collected in a sympatric series.

NOTES. The vesica is unusual in not forming an incomplete loop. *K. epicarsius* looks like *K. melanoriensis* but the latter has a different and unusual vesica which is tightly recurved (Fig. 18F). One specimen from Mt Finnigan illustrates the unstable venation found in many Schizopteridae in that the posterior vein of the forewing anastomoses subapically with the intermediate vein on right but not left wing (Fig. 13E,F). *K. epicarsius* was collected in berlesates of leaf litter, leaf and fungi litter, streamside flood litter and stick brushings, flight intercept traps and by pyrethrum knockdown in rain forest, lowland rain forest, littoral rain forest and *Araucaria* forest.

Kaimon eungellanus sp. nov.
(Figs 4H, 6H, 8H, 10F, 14G, 17D, Tables 2, 3)

ETYMOLOGY. From the Eungella region.

MATERIAL. ANIC. Holotype: sub. ♂, 2.5km ESE Eungella, 21°08'S 148°31'E, 200m, A. Gillison, 18 Nov 1981, tall open woodland LB-ANIC/C24, carded ex ethanol. Paratypes: 3 sub. ♂ and 9 ♀ in vial, 1 ♀ carded, 1 sub. ♂ in slide and vial, 1 ♀ in slide and vial.

DESCRIPTION. *Submacropterous Male.* General colour dark brown but vertex lobe and costal veins yellow brown. Frons curvature not flattened. Vertex without pit, with elevated, U-shaped lobe bounded by U-slit.

Pronotal disc concave adjacent to vertex lobe; disc deflated, not decurved anteriorly, with undulating contours, posteriorly upcurved;

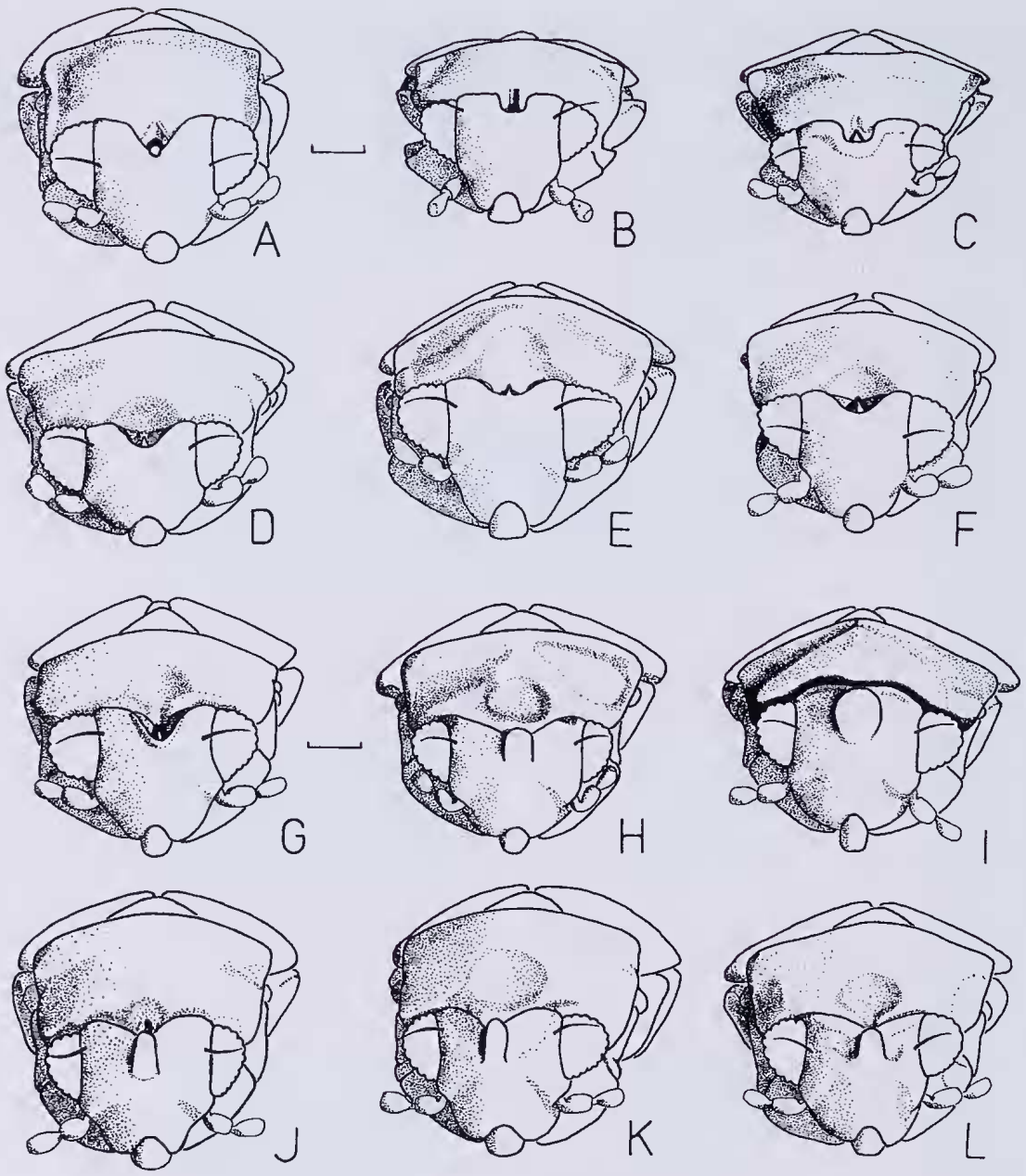

FIG. 8. Submacropterous ♂♂, anterior half, anterior. A, *K. conwayensis*; B, *K. micropterus*; C, *K. webbensis*; D, *K. pismaensis*; E, *K. athertonensis*; F, *K. allomelanoriensis*; G, *K. leeiensis*; H, *K. eungellanus*; I, *K. kroombitensis*; J, *K. alleungellanus*; K, *K. notipolysperes*; L, *K. byfieldensis*. Scale lines 0.1mm.

humeral angles not tumid; lateral margins roughly parallel (weakly convergent), dilate; posterior margin broadly deflexed and dilate for entire length. Metapleurae not prominent in dorsal view.

Forewings not paler proximally but costal vein yellow brown, 3 free veins subapically.

T1 microgranulate. Posterior margin S6 with intruded ledge submedially on left; right posterior angle S7 broadly and strongly projecting posteriorly, discs S5-7 with large, strongly depressed area submedially on right. Genital capsule with procurved, spinous tumescence on right posterior angle; left paramere 0.127mm. Conjunctival sclerites of aedeagus uncertain. Vesica incomplete loop, simple apex, no branch.

Female. Humeral angles, anteromedial diac area and apex scutellum yellow brown, veins brown except proximal costa yellow brown, I pale, closed cell. Spermatheca biglobular.

DISTRIBUTION. 1 locality in CQ at 200m. *K. alleungellanus* and *K. conwayensis* also occur in CQ. Females from 3 series without males (swamp and sclerophyll palm forests, 6.5km SSE Eungella, 800 m) may be this species or *K. alleungellanus*.

NOTES. Macropterous male unknown. In a slide preparation of a paratype male S5-7 bear a longitudinal, sublateral, slit passing through the intruded ledge on S6 margin. The slit may be an artefact of slide preparation associated with an abrupt change in disc contour. Collected in an open forest litter berlesate.

Kaimon finniganensis sp. nov.
(Figs 3H, 5H, 7H, 14I, 15J, 19J, Tables 2-3)

ETYMOLOGY. From the Finnigan Uplands region.

MATERIAL. QM. Holotype T108855: sub. ♂, Mt Finnigan summit via Helenvale, 1050m, Monteith, Sheridan, Roberts & Thompson, 3-5 Dec 1990, PK, carded. Paratypes: as for holotype, 2 sub. ♂ carded. OTHER MATERIAL. Mt Finnigan via Helensvale, 850-950m, Cook, Thompson & Roberts, 3-5 Dec 1990, 1 sub. ♂, 1 ♀; Mt Finnigan summit via Helensvale, 1050m, ditto, 1 sub. ♂; Mt Finnigan 37km S of Cooktown 15°49'S 145°17'E, 900m, Monteith, Yeates, Cook, 22 Apr 1982, 1 sub. ♂, 4 ♀; Mt Finnigan, 37km S. Cooktown, 15°49'S 145°17'E, 1050m, Monteith, Yeates, Thompson and Cook, 21 Apr 1982, 2 sub. ♂ and 2 ♀ (lost during observation); in QM.

DESCRIPTION. *Submacropterous Male*. General colour yellowish brown to brown, vertex concolourous but rim of pit dark if specimen pale. Vertex pit in dorsal view circular, posterior margin formed by excavate anteromedial margin of protruding disc, arc-shaped in anterior view, anterior margin not depressed, clearly defined but without acute rim, no depression anterior to pit but curvature of frons flattened; medial ridge of pit recessed, disjunct from anterior rim.

Protrusion of pronotal disc embracing pit ridge in anterior view and widely embracing pit ridge in dorsal view; points of disc protrusion projecting into pit laterally, confluent in anterodorsal view with vertex pit rim but inferior to it, line between points concave in dorsal views perpendicular to disc and perpendicular to whole body axis; disc flat immediately above pit; disc convex anteriorly and strongly decurved in lateral view, not concurvilinear with vertex profile; weakly convex posteriorly and concurvilinear with anterior profile; lateral margins parallel in dorsal view except tumid humeral angles; lateral margins not dilate. Metapleurae prominent in dorsal view. Mesopleural tumescences at level of metapleural shelf conspicuously dark tipped.

Posteroventral macroseta on hind tibiae short (1.1 tibial diameters).

Forewings paler proximally but pale cells and veins not contrasting strongly with darker distal veins and cells; 2 free veins subapically.

T1 granulate medially, carinulate laterally. Posterior margin S6 with small asymmetric projection right of midline (Fig. 14I). Disc of S7 without tumescence, posterior margin sinuous, moderately produced on right. Genital capsule with tumescence on right posterior angle (Fig. 14I); left paramere unmeasured. Conjunctival sclerites of aedeagus with spinous process as long as basal plate (Fig. 15J). Vesica not looped but incurved subbasally and subapically; vesica with subequal incurved branch arising near midlength, vesica or branch apically bifid.

Female. Brown, forewings paler, 1 cream, closed cell.

DISTRIBUTION. Mt Finnigan at 850-1050m.

NOTES. Macropterous male unknown. Collected in litter berlesates, pitfall traps and by pyrethrum knockdown in rain forest.

Kaimon kroombitensis sp. nov.
(Figs 4I, 6I, 8I, 14N, Tables 2, 3)

ETYMOLOGY. From the Kroombit Tops region.

MATERIAL. TYPES. Holotype. T108862: sub. ♂, site 10, Kroombit Tops, 45km SSW Calliope, 24°23'S 150°56'E, 720m, Monteith, Davies, Thompson & Gallon, 11 Dec 1983, RFSLB-QM628, carded ex ethanol, in QM. Paratypes: 1 sub. ♂ and 3 ♀ in vial, 1 sub. ♂ in slide and vial, 1 ♀ in slide and vial, as for holotype, in QM. OTHER MATERIAL. Kroombit Tops, 45km SSW Calliope, sites 6, 11, 14 and another, 24°22'-24'S 150°56'-151°01'E, 880-940m, 10-14 Dec 1983, Monteith, Davies, Gallon & Thompson, 1 sub. ♂, 6 ♀ in 4 series; Dan Dan Scrub,

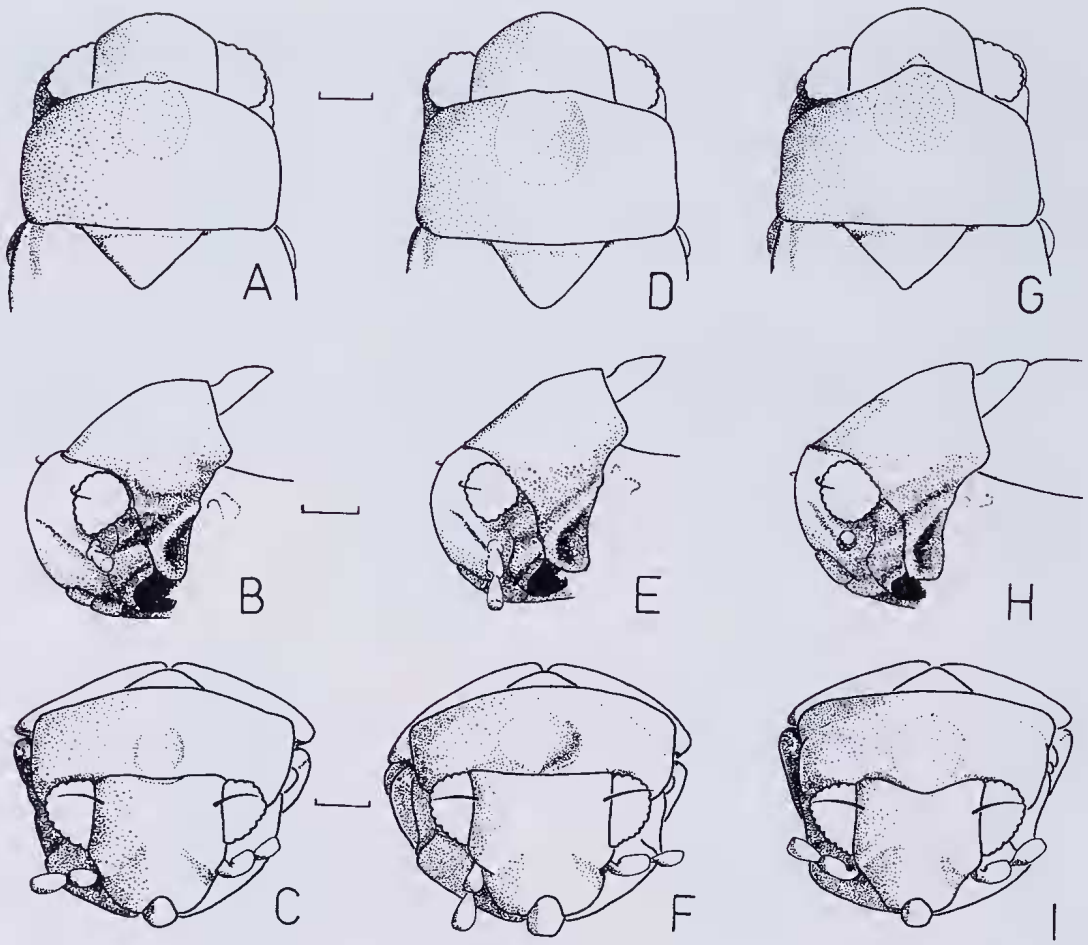

FIG. 9. Submacropterous ♂♂, anterior half, dorsal, left lateral and anterior views. A-C, *K. plistonotius*; D-F, *K. mesambrinus*; G-I, *K. bulburinensis*. Scale lines 0.1mm.

21km SSW Calliope, site 1, 24°10'S 151°05'E, 100m, Monteith, Davies, Gallon & Thompson, 14 Dec 1983, 1 ♀; in QM.

DESCRIPTION. *Submacropterous Male.* General colour dark brown, vertex lobe yellow-brown, posterior eighth of disc lighter brown. Vertex without pit but with U-shaped, broad lobe, oriented vertically, bounded by U slit.

Pronotal disc with anterior margin partially overhanging vertex lobe; disc in profile with two convex sections anteriorly, flat posteriorly; humeral angles not tumid; lateral margins weakly convergent-parallel, dilate. Metapleurae conspicuous in dorsal view.

Forewings not pale proximally, 3 free veins subapically.

T1 microganulate. Posterior margin S6 simple. Right posterior angle S7 broadly and strongly projecting posteriorly, discs S5-7 with large, strongly depressed area submedially on right. Genital capsule with broad rounded tumescence on right posterior angle; left paramere 0.135mm. Conjunctival sclerites of aedeagus with short spinous process much shorter than basal plate. Vesica single loop, simple apex, no branch

Female. Posterior quarter of disc, veins and scutellum apex lighter brown than remainder of body, forewing with 1 cream, closed cell.

DISTRIBUTION. 4 sites at Kroombit Tops and nearby lowland Dan Dan Scrub in SQ at 100-940m.

NOTES. Macropterous male unknown. Collected in open and rain forest litter berlesates.

Kaimon lambensis sp. nov.
(Figs 3J, 5J, 7J, Tables 1, 2)

ETYMOLOGY. From the Lamb Range.

MATERIAL. TYPE. Holotype: sub. ♂, Mt Tip Tree, 17°03'S 145°37'E, B. Halliday, 13 Jul 1984, RF yellow trap, 1 sub. ♂, carded ex ethanol, in ANIC.

DESCRIPTION. *Submacropterous Male.* General colour dark reddish brown, vertex concolourous. Vertex pit in dorsal view semicircular anteriorly, ill-defined posteriorly by gently inclined protrusion of anteromedial margin of disc, U-shaped in anterior view, ridge visible but no arch in anteromedial disc margin embracing ridge in anterior view, anterior margin of pit acute, not depressed, no depression anterior to pit, medial ridge of pit conspicuous but weakly recessed and disjunct with anterior rim of pit.

Pronotal disc projecting broadly into vertex pit, apices of protrusion incised, intimately embracing pit ridge, line between broad points of protrusion deeply incised; disc broadly and clearly weakly concave above vertex pit, inclining into pit; convex anteriorly and strongly decurved in lateral view, not concurvilinear with head profile; almost flat posteriorly but colinear with anterior profile; humeral angles tumid; lateral margins weakly convergent in dorsal view, not dilate. Metapleurae prominent in dorsal view.

Forewings without pale band subbasally; 2 free veins subapically.

T1 unknown. Posterior margin S6 simple. S7 without contiguous tumescence and depression on right side, posterior margin weakly projecting on right. Genital capsule simple, right posterior corner probably distinctly tumescent; left paramere unmeasured. Conjunctival sclerites of aedeagus and vesica unknown.

DISTRIBUTION. 1 locality at Mt Tip Tree in the Lamb Uplands at an unknown elevation.

NOTES. Female and macropterous male unknown. Collected in rain forest yellow trap. *K. epicarsius* was also found at Mt Tip Tree by the same collector on the same date but in a litter berlesate. No slides were prepared for this description.

Kaimon leeiensis sp. nov.
(Figs 4G, 6G, 8G, Tables 2, 3)

ETYMOLOGY. From the Lee Uplands region.

MATERIAL. HOLOTYPE. T108861: sub. ♂, Wallaman Falls via Ingham, 500m, Monteith, 1 Oct 1980, RF stick brushing B-QM231, carded ex ethanol, in QM.

DESCRIPTION. *Submacropterous Male.* General colour light brown, rim of vertex pit darker, apex of scutellum and bases of forewing veins paler. Curvature of frons weakly flattened (Fig. 6G). Vertex pit in dorsal view triangular, posterior margin formed by squarely excavate margin of disc protrusion; in anterior view roundly V-shaped, ridge and arch of disc embracing ridge barely visible, anterior margin with acutely defined, raised rim, medial ridge of pit recessed below rim and disjunct from anterior rim of pit.

Pronotal disc protrusion closely embracing pit ridge; weakly concave to flat above pit with inclined area protruding into pit; line between points of protrusion apeparing briefly straight; disc convex anteriorly and inclined in lateral view, not concurvilinear with head profile; weakly convex posteriorly and concurvilinear with anterior profile; humeral angles not tumid; in dorsal view lateral margins roughly parallel but faintly constricted at midlength, not dilate. Pronotal scars weakly impressed. Metapleurae prominent in dorsal view.

Forewing veins light brown distally, yellow brown proximally (also scutellum), all cells pale (no pale band effect when wings in repose), 2 free veins subapically.

T1 carinulation unknown. Posterior margin S6 simple. Disc of S7 with weak impression submedially and weak tumescence sublaterally on right. Genital capsule with distinct tumescence on right posterior angle; left paramere unknown. Conjunctival sclerites of aedeagus unknown. Vesica unknown.

DISTRIBUTION. 1 rainforest site at Wallaman Falls in the Lee Uplands region at 500m. Here, it is sympatric with *K. polysperes*, but was collected in a sieved litter berlesate series rather than a stick brushing berlesate series. It is also sympatric with an undescribed species known by 1 macropterous male from Wallaman Falls Road (in QM).

NOTES. Female and macropterous male unknown. Two tumescences on mesopleurae at the level of antennal shelf are more conspicuous than in most species because their dark apices contrast with the generally light colour of this species. Collected by rainforest stick brushing berlesate.

Kaimon macdowallensis sp. nov.
(Figs 3D, 5D, 7D, Table 2)

ETYMOLOGY. From the McDowall Range.

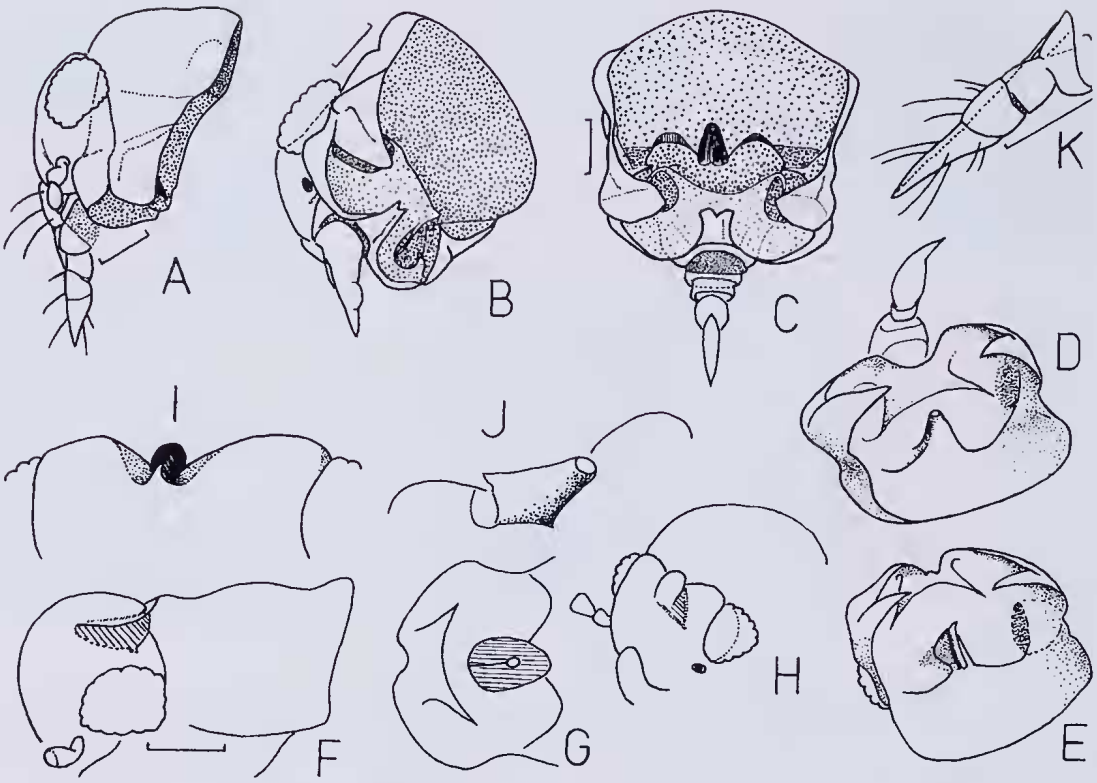

FIG. 10. A-C, head and pronotum, submacropterous ♂, *K. epicarsius*; A, left lateral; B, ventrolateral; C, ventral; D, same, *K. thortonensis* posteroventral; E, same, *K. alleungellanus*; F, same, *K. eungellanus*, lateral, internal vertex organ shaded; G, same without head, ventral; H, same, *K. alleungellanus*, left anterolateral; I-J, ♂ vertex organ, *K. athertonensis*, anterolateral; I, external; J, internal; K, labium, left anterolateral. Scale lines 0.1mm; sketches D-J not to scale or roughly to scale.

MATERIAL. HOLOTYPE. T108852. sub. ♂, McDowall Range, 17km N Daintree, 16°06'S 145°20'E, 520m, Monteith, 27 Nov 1985, RFSLB-QM684, carded, in QM.

DESCRIPTION. *Submacropterous Male.* General colour dark brown, vertex concolourous. Rim of vertex pit in dorsal view oval to diamond-shaped, posterior wall formed by sharply excavate anteromedial margin of disc, V-shaped in anterior view with embracing arch of disc protrusion clearly visible above obscured medial ridge of pit, pit rim depressed, indistinct and merging with shallow V-shaped depression diminishing toward frons; medial ridge of pit recessed and disjunct with anterior rim of pit.

Anteromedial margin of pronotal disc forming posterior margin of vertex pit in dorsal view, points of sharply excavate margin confluent with depressed rim of vertex pit (forming posterior apex of diamond-shaped pit), embracing pit ridge in anterior but not dorsal view; anteromedial disc sulcate immediately above vertex pit; convex anteriorly and decurved in lateral view, concurvilinear with vertex profile; weakly convex posteriorly but concurvilinear with anterior profile; humeral angles not tumid; lateral margins parallel in dorsal view, not dilate. Metapleurae prominent in dorsal view.

Forewings not pale proximally; 2 veins subapically.

T1 unknown; posterior margins S5 and S6 simple; S7 disc unknown, posterior margin weakly projecting on right. Genital capsule simple, right posterior corner without distinct tumescence; left paramere and conjunctival sclerites of aedeagus unknown. Vesica in form of incomplete loop; vesica probably with long branch; apex of branch or vesica bifid.

DISTRIBUTION. One site in the Thornton Uplands region but not one of the many at which *K. thorntonensis* occurs. *K. macdowallensis* is

known only from the holotype which was sympatric in series with a submacropterous male of *K. epicarsius*.

NOTES. Female and macropterous male unknown. The holotype was moved from ethanol to a card and retained intact. The genitalia was not slided. Collected by rain forest sieved litter berlesate.

Kaimon melanoriensis sp. nov.
(Figs 1B, 3B, 5B, 7B, Table 2)

ETYMOLOGY. Greek melanos, black, oros, mountain; from Black Mountain.

MATERIAL. ANIC. Holotype: sub. ♂, Black Mtn Rd, 30km N Kuranda, J.G. Brooks, 4 Nov 1969, ANIC165, carded on multiple mount with 2 sub. ♂ that are paratypes of *K. allomelanoriensis*. Paratypes: 1 sub. ♂, as for holotype, carded on multiple mount with 1 sub. ♂ that is the holotype of *K. allomelanoriensis* and 1 indeterminate ♀. OTHER MATERIAL. None but females carded on multiple mounts with specimens of *K. allomelanoriensis* (listed below) may be *K. melanoriensis*.

DESCRIPTION. *Submacropterous Male.* As for *K. epicarsius* but 3 veins subapically, T1 unknown, genital capsule with small tumescence on right posterior corner; genitalia not examined in slide mount, left paramere roughly 0.084mm (stereomicroscope measure only, not slide mount), conjunctival sclerites of aedeagus unknown, vesica tightly recurved (neither spiralled or sinuous) (Fig. 18F), vesical apex unknown; vesica perhaps with short proximal branch.

Female. See notes.

DISTRIBUTION. 1 locality in the Black Mountain Corridor region where it was sympatric in series with *K. allomelanoriensis*.

NOTES. *K. melanoriensis* looks like *K. epicarsius* but the latter has a different and unusual vesica which is sinuous. Macropterous male unknown. The types are on 2 multiple card mounts also bearing 3 males of *K. allomelanoriensis*. These 2 mounts belong to a series of 4 multiple card mounts containing *K. melanoriensis* and *K. allomelanoriensis*. The other 2 mounts each bear 2 indeterminate females. The habitat is unknown but the ANIC165 code implies collection by leaf litter or similar berlesate.

Kaimon mesambrinus sp. nov.
(Figs 9D-F, 14K, 16I, 19H, Tables 2, 3)

ETYMOLOGY. Greek *mesembria*, south; alluding to the distribution of this species.

MATERIAL. Holotype. T108866: sub. ♂, Mt Coot-tha, Monteith, 13-20 Mar 1971, carded in triple mount with 2 sub. ♂ paratypes (holotype central, 1 paratype damaged, mostly lost), in QM. Paratypes: as for holotype, 2 sub. ♂, on card mount with holotype, 2 sub. ♂ and 8 ♀ on three card mounts, in QM.

DESCRIPTION. *Submacropterous Male.* General colour brown, posterior quarter disc lighter brown, vertex with yellow-brown triangle medially. Curvature of frons not flattened, vertex without pit or lobe, without vestigial depression, posterior vertex in profile colinear with pronotal disc but abruptly decurving anteriorly to frons (Fig. 9E).

Pronotal disc clearly and broadly flattened anteromedially, anterior margin with vestigial medial emargination; anterior margin in dorsal view weakly deviating from straight line; disc in profile straight anteriorly and weakly convex posteriorly; humeral angles not tumid; lateral margins parallel, not dilate. Metapleurae prominent.

Forewings without pale band proximally, 3 free veins subapically.

T1 microganulate. Posterior margin S6 simple. Right posterior angle S7 broadly and strongly projecting posteriorly, discs S5-7 with large, strongly depressed area submedially on right. Genital capsule with broad rounded tumescence on right posterior angle; left paramere 0.122mm. Conjunctival sclerites of aedeagus with short spinous process (Fig. 16I). Vesica forming single spiralled loop, apex simple, no branch.

Female. Veins light brown to brown, 1-2 closed, pale cells.

DISTRIBUTION. 1 locality in SQ at low altitude. The more widespread, macropterous *K. notipolysperes* occurs at surrounding localities within a 30km radius. A female from Petrie, 4-5 Sep 1965, B. Cantrell (in QM), could be either species.

NOTES. Macropterous male unknown. One paratype male with aberrant spur vein on right forewing emerging marginally between clavus and apex. Collecting method and habitat unknown.

Kaimon micropterus sp. nov.
(Figs 4B, 6B, 8B, 13G, 15C,K, Tables 2-3)

ETYMOLOGY. Greek *micro-*, small, *pteron*, wing; for micropterous forewings of males.

MATERIAL. TYPES. All in ANIC. Holotype: micropterous ♂, 1km N Rounded Hill, 15°17'S 145°13'E, Calder & Weir, 5-7 May 1981, OFLB-ANIC725, carded.

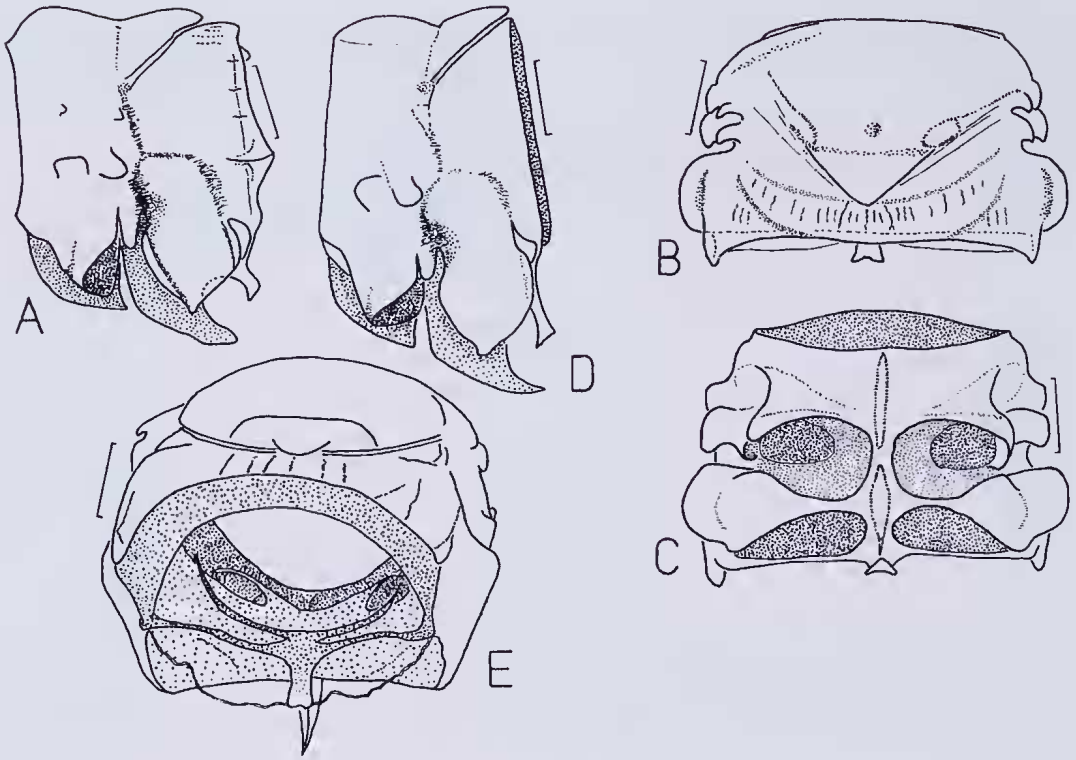

FIG. 11. Pterothorax. A-D, *K. epicarsius*; A-C, submacropterous ♂; A, lateral; B, dorsal; C, ventral; D, ♀; E, *K. polysperes* submacropterous ♂, right posterodorsolateral view. Scale lines 0.1mm.

Paratypes: as for holotype, 1 micropterous ♂ and 3 ♀ in vial, 1 ♀ cleared in vial, 1 micropterous male in 1 slide and vial, 1 ♀ carded. OTHER MATERIAL. 1km N Rounded Hill, 15°17'S 145°13'E, Calder & Weir, 5-7 May 1981, 4 micropterous ♂, 1 ♀ in ANIC. Bakers Blue Mtn, 820m, ANZSES, 1-18 Jan 1990, 1 micropterous ♂, in QM.

DESCRIPTION. *Micropterous Male*. General colour brown, vertex paler. Vertex pit (inner margins) in dorsal view square, posterior wall formed by straight margin of protruding disc, in anterior view square, ridge and arch in disc embracing ridge not visible, anterior margin not depressed, with acutely defined rim, vertex not depressed anteriorly to pit, medial ridge of pit recessed but confluent with anterior rim of pit.

Proepimeral shelves very wide, posterior angle in dorsal view rectilinear not absent or acute. Pronotal disc convex above vertex pit (but fine seta create impression of shallow sulcus in some views), inclining into pit but not embracing pit ridge, apex of protrusion squarely truncate (without points), inferior to rim of pit; disc convex anteriorly, weakly decurved in lateral view, concurvilinear with head profile; flat posteriorly and concurvilinear with anterior section; lateral margins in dorsal view parallel posteriorly but convergent anteriorly because of truncate angles, not dilate anteriorly, merging into descending pillar-like contour midway and overhanging posteriorly (Fig. 6B), humeral angles weakly tumid but not evidently so in dorsal view. Metapleurae prominent in dorsal view and sharing prominent angulate profile of propleural shelves in anterodorsal view.

Forewings reaching posterior margin T3, veins brown, except costa light brown proximally, 2 closed pale cells.

T1 carinulae reduced to granulate texture (Fig. 15C); carinulae of T2-6 short, half or less tergal width. Posterior margin S6 with long, narrow, symmetrical ledge. Disc of S7 with distinct tumescence sublaterally on right near posterior margin, posterior margin weakly projecting on right. Genital capsule simple, right posterior corner without distinct tumescence; left paramere 0.114mm. Conjunctival sclerites of aedeagus lacking spinous process. Vesica sinuous, not looped, vesical apex simple; vesica

with subequal, sinuous branch arising near midlength, branch apex simple.

Female. Propleural angles not rectangular in dorsal view, venation brown, 1 small, closed cell.

DISTRIBUTION. The disjunct distribution in open forest of Mt Webb region and in rainforest 150km S at Bakers Blue Mountain near the Carbine Uplands region raises doubt about the conspecificty of the latter male with the type series given the frequency of short range endemism or vicariance in other nonmacropterous species of this genus and the family in general. *K. webbensis* occurs about 30km to the north of the type locality of *K. micropterus*.

NOTES. Submacropterous and macropterous males unknown. This is the only species with a micropterous male. The forewings are marginally larger than those of females of this genus. They are too short, in not reaching T6, to be described a brachypterous. Collected in litter berlesates from open forest and a pitfall trap in rainforest.

Kaimon notipolysperes sp. nov.
(Figs 2D,E, 4K, 6K, 8K, 12A,B, 19E, Tables 2, 3)

ETYMOLOGY. Greek *notios*, southern, *poly-*, many, *speres*, sites; refers to its occurrence at many SQ and adjacent localities.

MATERIAL. Holotype. T108864: sub. ♂, nr Poona Lake, Cooloola NP, 26°00'S 153°06'E, Calder, 18 Apr 1982, carded ex ethanol, in QM. Paratypes: as for holotype, 20 sub. ♂, 17 ♀ in vial, 1 sub. ♂ carded, 2 ♀ carded, 1 sub. ♂ in slide plus vial, 1 ♀ in slide plus vial, 1 nymph, in ANIC, OTHER MATERIAL. Three 3 sub. ♂ and 3 ♀ were removed from the type series and sent to Australian Museum, Sydney for scanning electron micrography. All southern Queensland except Wiangaree which is New South Wales. Camp Milo, Cooloola NP, 26°00'S 153°05'E, Calder, 15-18 Apr 1982, 15 ♂, 43 ♀, 2 nymphs in 3 series; Balfour Range, 5km E Benarkin, 25°53'S 152°11'E, L. Hill, 19 Jun 1982, 1 sub. ♂, 2 ♀; 5km E Yarraman (Pidna), 26°52'S 152°03'E, L. Hill, 19 un 1982, 1 sub. ♂; Yabba Ck Forest, 7km SW Kenilworth, 150m, Peck, 15 Aug 1982, 1 sub. ♂; Wiangaree SF, 33km NE Wiangaree, NSW 1000m, Peck, 1 sub. ♂; in ANIC. Acacia Ridge, Brisbane, Sep 1962, E.B. The, 1 sub. ♂; Canungra Ck, 4 ml S Canungra, 14 Mar 1971, Monteith, 1 sub. ♂, 2 ♀; Dingo Ck via Traveston, GB. & S.R. Monteith, 30 Dec 1974 - 27 Mar 1975, 2 mac. ♀; Cold Ck via Imbil, GB. & S.R. Monteith, 1 mac. ♂; Top of Blackbutt Ra., Benarkin, GB. & S.R. Monteith, 1 sub. ♂; Freshwater Rd, Cooloola nr Rainbow Beach, 25-27 Apr 1975, Naumann, 2 ♀; Rainbow Beach, Cooloola, A. Postle, 17 Apr 1976, 3 sub. ♂; Stony Ck via Samford, 27°20'S 152°48'E, Janetzki & Monteith, 22 Oct 1994 - 2 Feb 1995, 1 sub. ♂, 1 ♀; Blackbutt Range, 5km E Benarkin, Gallon & Thompson, 30 Mar 1983, 2 ♀; in QM

DESCRIPTION. *Submacropterous Male*. General colour dark reddish brown, vertex lobe yellow-brown, venation brown but costa and 2V yellow-brown. Frons profile almost perpendicular to vertex. Vertex without pit but with U-shaped, elevated lobe bounded by U slit.

Pronotal disc with large flat to weakly concave area adjacent to vertex lobe; disc in profile flat to weakly convex anteriorly, almost flat posteriorly; humeral angles not tumid; lateral margins parallel, not dilate. Metapleurae not prominent in dorsal view.

Posteroventral macroseta on hind tibiae long (2.8 tibial diameters).

Forewings not paler proximally, 3 free veins subapically.

T1 microganulate. Posterior margin S6 simple. Right posterior angle S7 broadly and strongly projecting posteriorly, discs S5-7 with large, strongly depressed area submedially on right. Genital capsule with distinct tumescence on right posterior angle; left paramere 0.131mm. Conjunctival sclerites of aedeagus with short spinous process much shorter than basal plate (Fig. 19E). Vesica single loop, simple apex, no branch (Fig. 19E).

Macropterous Male. Anterior disc profile straight, colinear with vertex profile, posterior disc profile convex.

Female. Brown, posterior quarter of disc lighter brown, forewing with 1 closed, cream cell.

DISTRIBUTION. 12 localities in SQ and 1 in N NSW between sea level and 1000m. *K. mesambrinus*, for which no macropter is known, occurs within the range of this species at 1 site in SQ, namely Mt Coot-tha. A female from nearby Petrie, 4-5 Sep 1965, B. Cantrell (in QM), could be either species.

NOTES. Collected in rain forest litter (including scrub turkey mound litter) berlesates, flight intercept traps and pitfall traps and a wet sclerophyll flight intercept trap.

Kaimon pismaensis sp. nov.
(Figs 4D, 6D, 8D, 15B, 18A, Tables 2, 3)

ETYMOLOGY. Greek *peisma*, ship's cable; refers to the cableway in the Bellenden Ker – Bartle Frere Range Uplands region.

MATERIAL. HOLOTYPE. T108859: sub. ♂, Bellenden Ker Range, 0.5km S cable tower 7, 500m, Queensland Museum Earthwatch team, 1-7 Nov 1981, RFPT, carded ex ethanol, in QM. OTHER MATERIAL. Bellenden Ker Range, 1km S cable tower 6, 17°16'S 145°53'E, 500m, EQM, 17-24 Oct 1981, 1 sub. ♂, 4 ♀, in 4 series; Bellenden

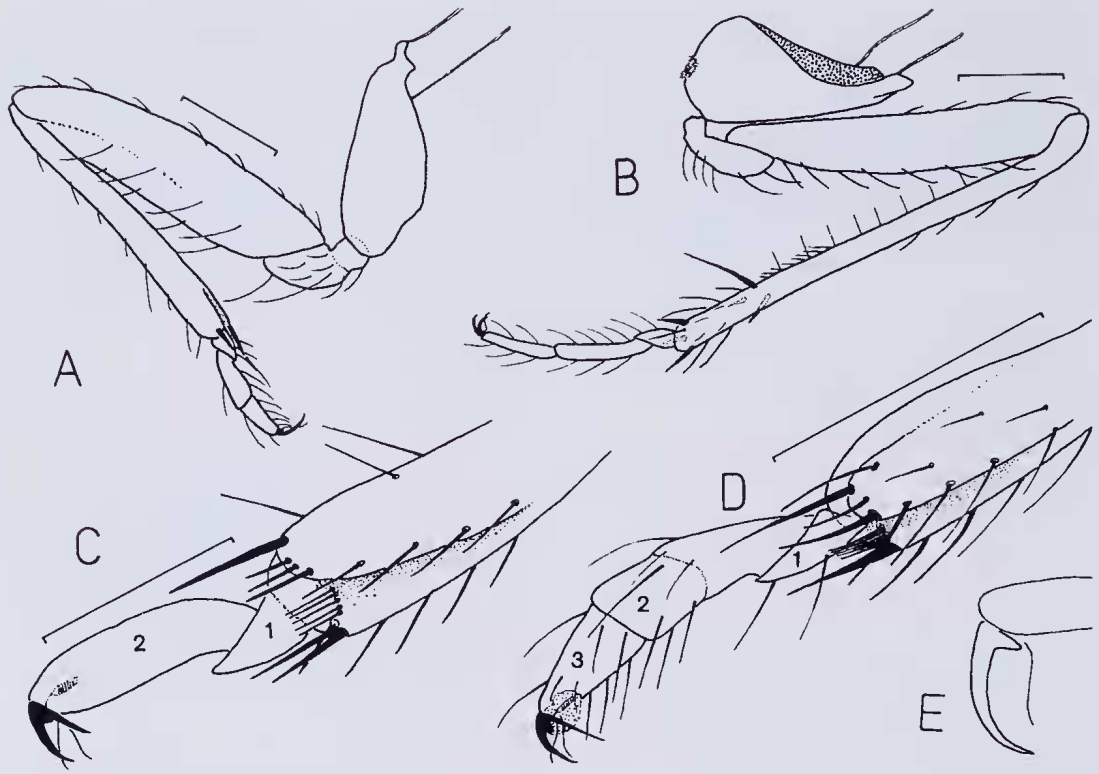

FIG. 12. A-B, *K. notipolysperes* submacropetrous ♂; A, mid leg, anterior; B, hind leg, posterior; C-D, *K. epicarsius*; C, ♀ foretarsus, anterior; D, same, ♂; E, hind claw, *K. sidereoriensis*.

Ker Range, 0.5km S cable tower 7, 500m, EQM, 1-7 Nov 1981, 1 ♀; in QM.

DESCRIPTION. *Submacropterous Male.* General colour brown, head paler. Vertex pit in dorsal view semicircular anteriorly, posterior wall formed by concave face of disc protrusion, in anterior view broadly and roundly V-shaped, ridge barely visible, no arch evident in disc protrusion, anterior margin not depressed, anterior margin with acutely defined rim, vertex not depresed anteriorly to pit, medial ridge of pit flush with rim of pit and confluent with anterior rim of pit.

Pronotal disc projecting into pit and flattening into horizontal apex with tiny notch embracing ridge, protrusion otherwise squarely truncate; disc conspicuously concave above pit, convex anteriorly and strongly decurved in lateral view, not concurvilinear with head profile; weakly convex posteriorly and concurvilinear with anterior profile; humeral angles tumid; lateral margins convergent in dorsal view, not dilate; posterior margin narrowly decurved. Metapleurae not prominent in dorsal view.

Forewings paler proximally, in repose forming pale transverse band on body; 2 free veins subapically.

T1 granulate (Fig. 15B). Posterior margin S6 simple. Disc of S7 with very weak impression submedially but no adjacent tumescence sublaterally on right, posterior margin weakly produced on right. Genital capsule with distinct tumescence on right posterior corner; left paramere 0.208mm. Conjunctival sclerites of aedeagus with short spinous process much shorter than basal plate (Fig. 18A). Vesica sinuous, not looped, with subapical tooth; vesica with subequal, cosinuate branch arising beyond midlength, branch apex simple.

Female. Venation brown, lighter towards costa; 2 cream, closed cells.

DISTRIBUTION. Known from 2 localities in rainforest at 500m associated with the Bellenden Ker Range cableway in Bellenden Ker - Bartle Frere Uplands region. Females from the

cableway base station at 100m might be this species or the widespread macropterous species *K. epicarsius*. The latter is known from the cableway base station.

NOTES. Macropterous male unknown. Collected in litter berlesates and pitfall traps in rain forest.

Kaimon plistonotius sp. nov.
(Figs 9A-C, 14J, 18C, Tables 2, 3)

ETYMOLOGY. Latinised Greek adjective meaning 'most southern' alluding to the distribution of this species.

MATERIAL. TYPES. Holotype: sub. ♂, Wilson Park, 3km ESE Lismore, 50m, NSW, Peck, 25 Aug 1982, dry RFB-SBP113S, carded ex ethanol, in ANIC. Paratypes: 7 sub. ♂ and 7 ♀ in vial, 1 ♀ carded, 1 sub. ♂ in 2 slides and vial, 1 ♀ in slide, as for holotype, in ANIC. OTHER MATERIAL. New England National Park, 1500m, NSW, Peck, 26 Aug 1982, 3 sub. ♂, 3 ♀.

DESCRIPTION. *Submacropterous Male.* General colour dark red-brown, posterior third disc lighter brown, venation brown but costa and claval marginal vein yellow-brown, vertex not yellow-brown medially. Curvature of frons not flattened, profile of frons merges gradually with vertex, vertex without pit or lobe but with minute, vestigial depression.

Pronotal disc slightly flattened anteromedially, anterior margin with vestigial medial emargination; disc straight in profile anteriorly and posteriorly but with change of plane; humeral angles not tumid; lateral margins parallel, not dilate; posterior margin narrowly deflexed full width. Metapleurae prominent in dorsal view.

Posteroventral macroseta on hind tibiae long (2.6 tibial diameters).

Forewings without pale band proximally, 1 free vein apically but two veins subapically, posterior vein coalseces with preceding vein.

T1 microgranulate. Posterior margin S6 simple. Right posterior angle S7 broadly and strongly projecting posteriorly, discs S5-7 with large, strongly depressed area submedially on right. Genital capsule with broad rounded tumescence on right posterior angle; left paramere 0.127mm. Conjunctival sclerites of aedeagus uncertain, probably with spinous process. Vesica forming single spiralled loop, apex simple, no branch.

Female. Posterior third disc lighter brown than remainder of body.

DISTRIBUTION. Known from 2 localities in northern New South Wales at 50 and 1500m. Two females from Barrington House, 40km NW Dungog, 400m not associated with males could belong to this species. Dungog is the southernmost locality for the genus in Australia.

NOTES. Macropterous male unknown.

Kaimon polysperes sp. nov.
(Figs 2C, 3I, 5I, 7I, 11E, 13A-B, 14L, 15G, 17A-C, Tables 2-3)

ETYMOLOGY. Greek adjective meaning 'widespread' alluding to the many regions in which this macropterous species occurs.

MATERIAL. TYPES. All in ANIC. Holotype: Sub ♂, 2.5km W by N Mt Baldy, 17°16'S 145°26'E, 1000m, Calder & Weir, 29 Mar 1984, ANIC948, carded. Paratypes: as for holotype, 3 mac. ♂, 20 sub. ♂ and 32 ♀ in ethanol, 1 sub. ♂, 2 ♀ and 1 mac. ♂ carded. OTHER MATERIAL. Three sub. ♂ and 3 ♀ were removed from the type series and sent to Australian Museum, Sydney for scanning electron micrography. Mine site, Mt Lewis via Julatten, A. Walford-Huggins, 8 Mar 1985, 7 sub. ♂, 1 nymph; Ravenshoe SF, Tully Falls Rd, A. Walford-Huggins, 10 Oct-15 Nov 1987, 1 mac. ♂; Birthday Ck, 6km NW by N Paluma, 18°59'S 140°10'E, Weir, 25 Sep 1980, 2 mac. ♂, 2 sub. ♂, 1 ♀; Tully Falls, A. Walford-Huggins, 4 Oct 1978, 2 mac. ♂; 1km S Mt Lewis, 950m, Calder & Weir, 28 Mar 1984, 11 sub. ♂, 23 ♀; Mt Windsor Tbld via Mt Carbine, 27 Dec 1984, A. Walford-Huggins, 1 ♀; Mt Lewis, 20km S Mossman, 1000m, Peck, 10 Jul 1982, 2 mac., 10 sub. ♂, 2 ♀; Topaz NP SE Malanda, 720m, Peck, 28 Jul 1982, 1 sub. ♂, 2 ♀; in ANIC. Mossman Bluff, 5-10km W Mossman, 250-1260m, MT/ANZSES, Jan 1988, Jan 1989, Dec 1989, Jan 1990, 16 mac. ♂, 1 ♀ in 11 series (of which 1 series sympatric with *K. epicarsius*); Windsor Tbld, 1225-1300m, E. Schmidt and ANZSES, 9 Jan 1989, 2 sub. ♂ in 2 series; 1.5km SW Mt Spurgeon via Mt Carbine, 1100m, MT/ANZSES, 21 Dec 1988-5 Jan 1989, 2 mac. ♂; 2km SW Mt Spurgeon via Mt Carbine, 1100m, MT/ANZSES, 20 Dec 1988-4 Jan 1989, 1 mac. ♂; Mt Fisher 7km SW Millaa Millaa, 1050-1100m, 27-29 Apr 1982, MYC, 1 mac. ♂ (in series with 2 sub. ♂ *K. athertonensis*); Mt Fisher (Kjellberg Rd), 17°32'S 145°33'E, 1100m, Monteith, 17 May 1995, 1 mac. ♂; Bluewater Range, 50km WNW Townsville, 700m, Monteith, Thompson & S. Hamlet, 5-9 Dec 1986, 6 mac. ♂; Birthday Ck, Paluma Dam Rd, 800m, 17 Nov 1990, Monteith & Seymour, 1 sub. ♂; Paluma Dam Rd, site 3, 800m, 17 Nov 1990-8 Dec 1990, Monteith & Seymour, 1 mac. ♂; Mt Halifax summit, 19°07'S 145°23'E, Cook, 21 Mar 1993 - 10 May 1993, 1 mac. ♂, 5 sub. ♂; Hughes Rd, Topaz, 17°26'S 145°42'E, 650m, Monteith & Breeden, Sep - Dec 1993, 2 sub. ♂, 1 ♀; Paluma Dam Rd, site 2, 720m, Monteith & Seymour, 17 Nov- 8 Dec 1990, 1 mac. ♂; Black Mtn Rd, Kuranda, 17°47'S 145°39'E, 360m, Monteith, 8 Jun 1980, 3 mac. ♂; Wallaman Falls via Ingham, 500m, 1 Oct 1980, Monteith, 1 mac. ♂; Wallaman Falls via Ingham, 500m, Monteith, 1 Oct 1980, 1 sub. ♂;

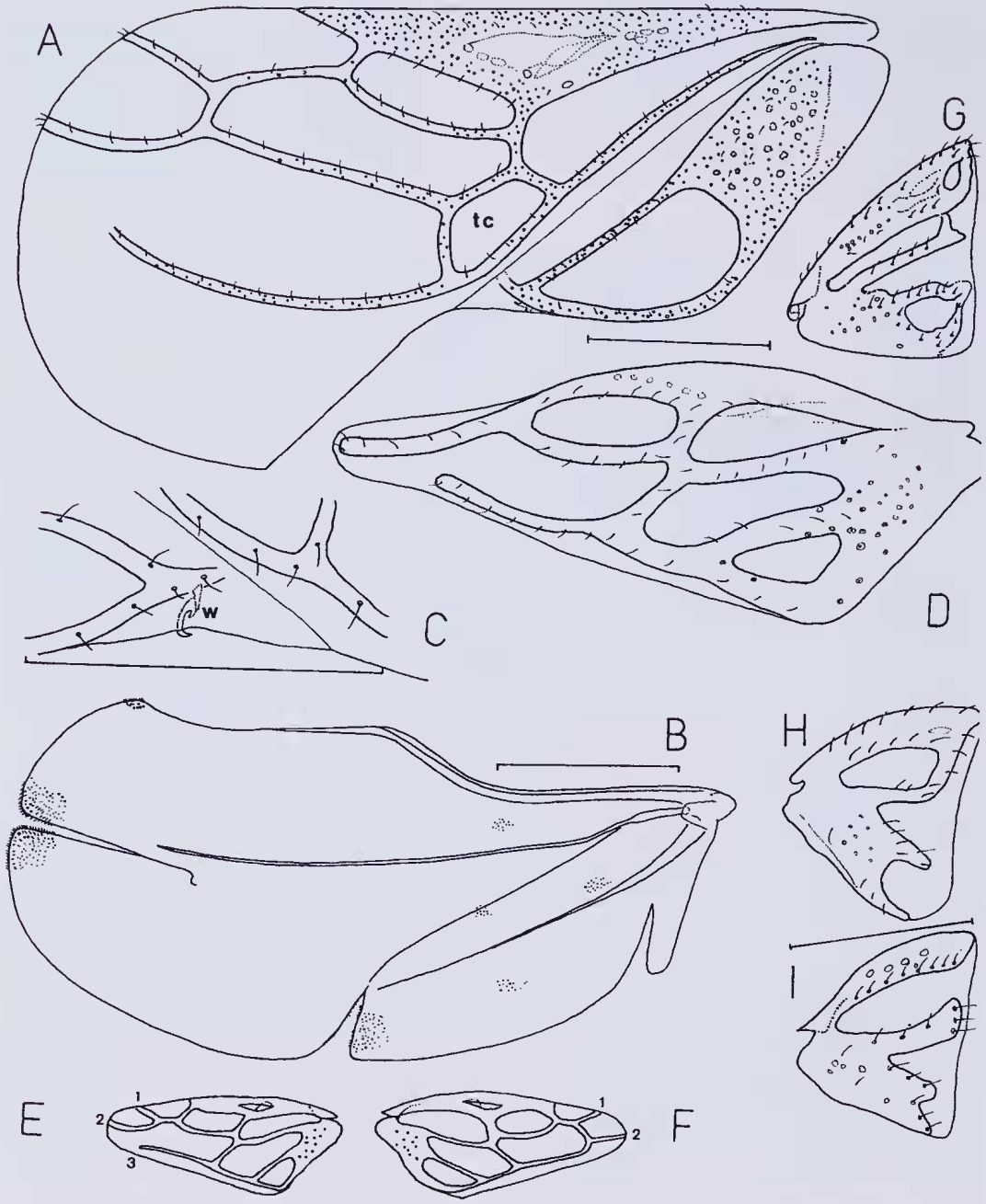

FIG. 13. Wings, dorsal views. A-B, macropterous ♂ *K. polysperes*; A, forewing; B, hind wing; C, undescribed ♂ ex Lamb Range, wing coupling on right claval apex; D-F, submacropterous ♂♂; D, *K. thortonensis*, left forewing; E-F, left and right forewings of one ♂ *K. epicarsius*; G, micropterous ♂, *K. micropterus*, right forewing; H-I, micropterous ♀, *K. epicarsius*, right forewings of two ♀♀ from one series. Scale lines 0.1mm; C, approximate scale; E-F unscaled sketches. tc=trapezpoidal cell; w=wing coupling; 1,2,3=apically free veins of forewing.

Windin Falls, NW of Mt Bartle-Frere, 580m, 9 Oct 1980, Monteith, 1 mac. ♂ (sympatric in series with 1 mac. ♂ *K. epicarsius*); Mt Lewis via Julatten, 16°35'S 145°12'E, Monteith, 12 Oct 1980, 1 sub. ♂; 2km N Mt Lewis via Julatten, 1000m, Monteith & Cook, 8 Sep 1981, 1 sub. ♂; Windsor Tbld, 28-35km NNW Mt Carbine, 900-1150m, MYC, 15-26 Apr 1982, 3 mac. ♂, 12 sub. ♂, 8 ♀ in 11 series; The Bluff, 11km W Mossman, 16°27'S 145°16'E, 950m, MY, 27 Apr 1983, 1 mac. ♂; Mt Fisher, 7km SW Millaa Millaa (Kjellberg Rd), 17°33'S 145°33'E, 1000m, MY, 3 May 1983, 1 sub. ♂, 3 ♀ in 2 series; 2.5km N Mt Lewis via Julatten, 16°34'S 145°16'E, 1040m, Yeates & Thompson, 3 Nov 1983, 1 sub. ♂, 1 ♀ in 2 series; 22km SW Mareeba, 17°07'S 145°36'E, 900m, Yeates & Thompson, 4 Nov 1983, 2 sub. ♂, 1 ♀; 21km S Atherton,17°27'S 145°28'E, 1040-1100m, 5 Nov 1983, Yeates & Thompson, 1 sub. ♂; Mt Fox Rd (Seaview Range), 18°50'S 145°50'E, 600m, MT, 15 Dec 1986, 2 sub. ♂ in 2 series; Broadwater Park via Ingham, 18°22'S 145°57'E, 60m, MT, 16 Dec 1986, 1 mac. ♂; Cardwell Range (Mt Macalister), 18°18'S 145°56'E, 1000m, MT, 20 Dec 1986, 1 sub. ♂; Cardwell Range (Upper Broadwater Valley), 18°18'S 145°56'E, 800m, MT, 13 Dec 1986, 1 mac. ♂, 1 ♀; Wallaman Falls Rd, 18°35'S 145°51'E, 600m, 14 Dec 1986, MT, 1 mac. ♂; Lamb Ra. 19km SE Mareeba, 17°06'S 145°34'E, 1200m, 3 Dec 1988, MT, 3 mac. ♂; Lambs Head, 10km W Edmonton, 17°02'S 145°38'E, 1200m, MT, 4 Dec 1988, 1 mac. ♂; Sluice Ck, 9km WSW Millaa Millaa, 17°33'S 145°33'E, 1150m, MT, 5 Dec 1988, 1 mac. ♂; Hugh Nelson Range, 2.5km S Crater NP, 17°17'S 145°28'E, 1100m, MT, 5 Dec 1988, 2 sub. ♂, 2 ♀; Hughes Rd, Topaz district, 17°26'S 145°42'E, 650m, 5 Dec 1983, 1 sub. ♂ (sympatric in series with 1 sub. ♂, 3 ♀ *K. epicarsius*); Mt Fisher (Kjellberg), 17°32'S 145°33'E, 1100m, Monteith, 17 May 1995, 1 mac. ♂ (sympatric in series with 1 sub. ♂ and 7 ♀ *K. athertonensis*); in QM.

DESCRIPTION. *Submacropterous Male.* General colour dark reddish brown to brown, vertex concolourous. Vertex pit in dorsal view pear-shaped (broader anteriorly), posterior margin formed by incised anteromedial margin of disc, U- to V-shaped in anterior view, ridge and embracing arch visible, anterior margin not depressed, with acutely defined rim, no depression anterior to pit but curvature of frons flattened, posterior apex of pear-shaped pit formed between points of incised apex of discal protrusion, medial ridge of pit more or less flush with rim of pit and confluent with anterior rim of pit, inner rim confluent with points of discal protrusion, outer rim superior to intruding points of disc.

Pronotal disc closely embracing ridge of pit in anterior and dorsal views, disc weakly flattened above pit, steeply inclined into pit but lacking any horizontal portion in pit, in dorsal view forming notched apex to pit rather than arc-shaped posterior wall, line between points of protruding disc incised in views dorsal to both disc and body axis; disc convex anteriorly and strongly decurved in lateral view, not concurilinear with head profile; weakly convex posteriorly, almost flat, slight discontinuity with anterior profile; humeral angles tumid and dilate (Figs 3I, 5I); lateral margins weakly convergent in dorsal view, dilate; posterior margin dilate near humeral angles. Metapleurae not prominent in dorsal view.

Forewings usually paler proximally, proximal 3 cells cream, proximal veins light brown, distal cells sooty brown, distal veins dark brown; 2-3 free veins subapically.

T1 carinulae in form of vestigial triangles, not clearly carinulate or granulate. Posterior margin S6 simple (Fig. 14L). Disc of S7 with weak impression submedially on right and weak tumescence sublaterally on right, latter not prominent and not adjacent to posterior margin, posterior margin weakly projecting on right. Genital capsule with distinct and acutely rounded tumescence on right posterior angle (Fig 14L); left paramere 0.204mm. Conjunctival sclerites of aedeagus possibly with short, spinous process (Fig. 17B). Vesica incomplete, biramous loop with subequal concurvilinear branch, vesical apex with subapical tooth; branch apex simple.

Macropterous Male. Length overall 1.12mm. Ridge of pit flush and confluent with rim of pit, lateral margins of disc dilate, humeral angles tumid and dilate as in submacropter; T1 carinulate; genital capsule with tumescence on right corner as in submacropter.

Female. Colour generally brown, forewing veins brown, 1 cream, closed cell.

DISTRIBUTION. *K. polysperes* occurs in 9 regions (Table 4) at 600-1200m and 1 site (Broadwater Park via Ingham) at 60m. It is 1 of 2 widespread species in the Wet Tropics, the other being *K. epicarsius*. Both are macropterous. It is sympatric with *K. epicarsius* at 4 localities (Mossman Bluff 600m and 760m, Windin Falls, 580m and Topaz District, 650 m), with *K. athertonensis* on Mt Fisher above 1050m and with *K. leeiensis* at Wallaman Falls at 600m.

NOTES. *K. polysperes* is distinguished by dilation of the humeral angles and a medial ridge in the vertex pit that is flush and confluent with the rim (Fig. 2C). A macropterous male from Baldy Mountain has an aberrant cross vein (1v-2v) at midlength on the clavus of the right but not left forewing. The pale band on the forewing was illdefined in some males from Mt Halifax.

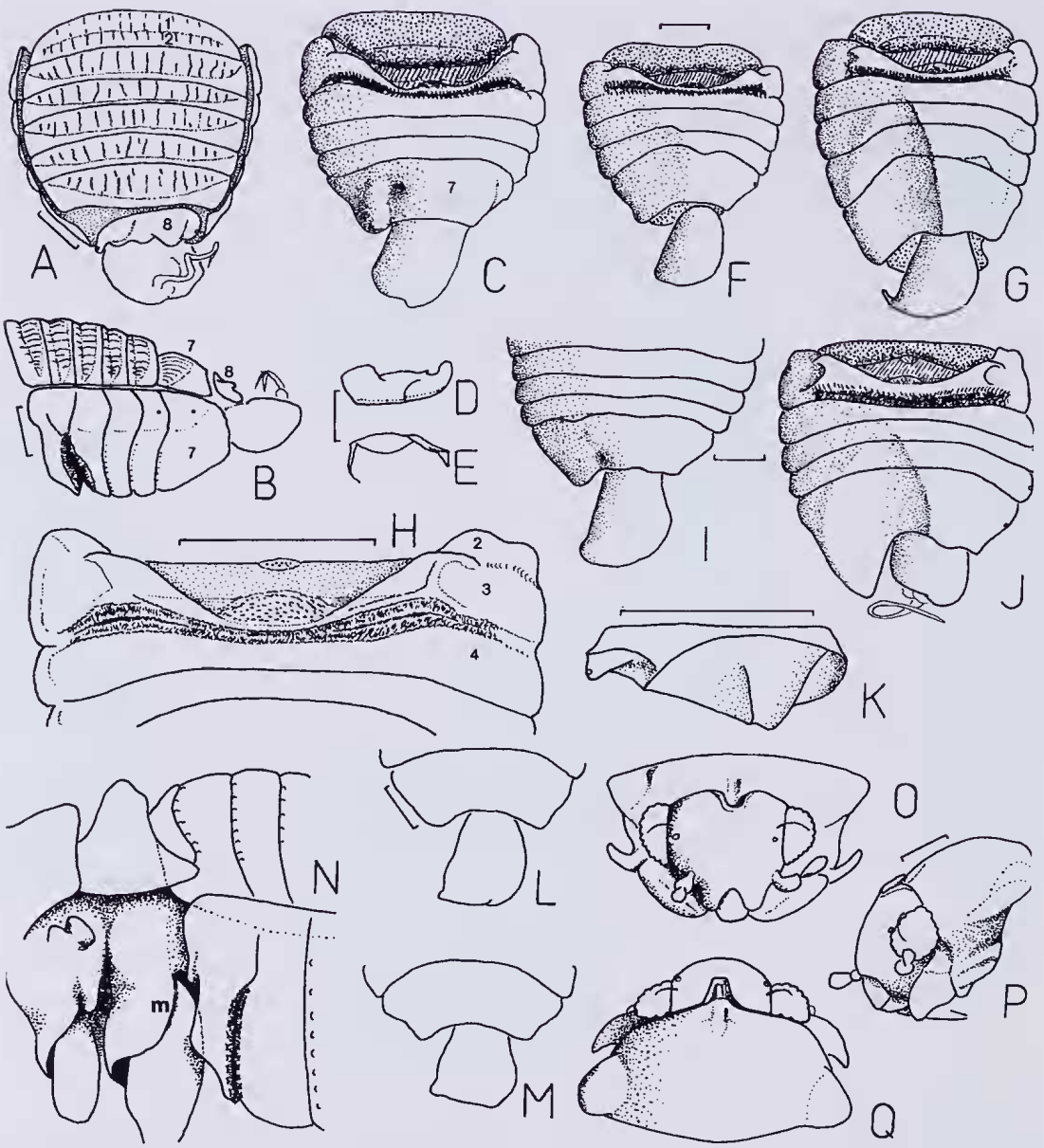

FIG. 14. A-M, ♂ abdomen. A-E, *K. epicarsius*; A, dorsal; B, lateral; C, ventral; D, T8, dorsal; E, same, anterior; F, *K. sidereoriensis*, ventral; G, *K. eungellanus*, ventral; H, same, S2-S5; I, *K. finniganensis*, ventral; J, *K. plistonotius*, ventral; K, *K. mesambrinus*, T8, dorsal; L, *K. polysperes*, caudum, ventral;m, *K. allomelanoriensis*, caudum, ventral; N, *K. kroombitensis* ♀, pterothorax and anterior abdomen, left lateral; O-Q, macropterous ♂, anterior half, undescribed species, Mt Tozer area; O, anterior; P, lateral; Q, dorsal. Scale lines 0.1mm; N unscaled sketch. C, F, G, J underside of T1-2 stippled, hyaline parts S2-3 hatched; H, hyaline parts S2-3 stippled. m=metepisternum where it abuts abdominal carinae; 2, 3, 4, 7, 8=sterna or terga.

Collected in litter, moss and stick brushing berlesates, pitfall traps and flight intercept traps in heath, open forest and rain forest.

Kaimon sidereoriensis sp. nov.
(Figs 2B, 3F, 5F, 7F, 14F, 15A, 19A-C,L, Tables 2-3)

ETYMOLOGY. Latinised Greek meaning 'of iron mountain', alluding to the Iron Range distribution.

MATERIAL. TYPES. All in QM. Holotype. T.108854: sub. ♂, West Claudie R., Iron Range, 12°45'S 143°14'E, 50m, Monteith, 9 Dec 1985, RFSLB-QM698, carded. Paratypes: as for holotype, 1 mac. ♂ carded, 1 ♀ carded, 9 ♀ (and 1 nymph) in ethanol. OTHER MATERIAL. 3-11km ENE Mt Tozer, 12°43'-44'S 143°14'-18'E, Weir, 1-16 Jul 1986, 4 mac. ♂, 8 sub. ♂, 11 ♀, 1 nymph in 5 series (of which 1 serics sympatric with the undescribed species mentioned below); in ANIC. West Claudie R., Iron Range, 12°43'-45'S 143°14'E, 50m, Monteith & Cook, 3-10 Dec 1985, 5 mac. ♂, 8 sub. ♂, 19 ♀ in 7 series; in QM.

DESCRIPTION. *Submacropterous Male.* General colour light brown with paler yellowish brown areas. Vertex pit circular in dorsal view with curved, posterior margin formed by excavate anteromedial protrusion of disc in dorsal view, anterior margin squared U-shape in anterior view, anterior margin indistinct, vertex faintly and broadly impressed anteriorly to pit, medial ridge of pit recessed and disjunct with anterior rim of pit.

Pronotal disc embracing ridge in vertex pit in anterior view but not projecting into pit in dorsal view, points of excavate anteromedial disc margin rounded and confluent with vertex pit rim in anterodorsal view, line between points concave in dorsal views perpendicular to disc and perpendicular to whole body axis (latter not true for mac. male), hence disc broadly but briefly sulcatc abovc vertex pit; convex anteriorly and strongly decurvcd in lateral view, not concurvilinear with vertex profile; convex posteriorly and concurvilinear with profile of anterior disc; humeral angles not tumid; lateral margins weakly convergent in dorsal view, not dilate. Metapleurae not prominent in dorsal view.

Forewings pale proximally, in repose forming pale transverse band on body (non costal veins brown proximally and distally, light brown medially, cells cream proximally, sooty brown distally).

T1 carinulate (Fig. 15A). Posterior margins S5 and S6 each with slight asymmetric projection left of midline indicating path of faint longitudal ridge running from S5 to S7 and forming medial margin of broad depressed area of right side of S7 disc (Fig. 14F). S7 without adjoining tumescence and depression on right side near posterior margin; posterior margin of S7 moderately produced. Genital capsule simple, right posterior corner without distinct tumescence; left paramere 0.085-0.094mm. Conjunctival sclerites of aedeagus lacking spinous process. Vesica incomplete spiralled loop, vcsical apex minutely incised, with short branch arising subapically.

Macropterous Male. Length overall 0.88mm (n=5). Lcft paramere 0.102mm (from type locality but not type series).

Female. General colour light brown with paler yellow-brown patches on head, anteromedial disc and scutellum, forewings concolourous with body except for 1 cream, closed cell.

DISTRIBUTION. Several sites in the Iron Range region in Cape York Peninsula at 50m and perhaps higher near Mt Tozer. *K. sidereoriensis* is sympatric with an undescribed, macropterous species, noted below, at 9km ENE of Mt Tozer.

NOTES. The number of free veins subapically on the fore wing varied from 2 to 3 between right and lcft of one suFrombmacropterous male. This was because vein 1 was absent on right side whereas in *K. epicarsius* the variation in number of free veins was because veins 2 and 3 anastomosed on right side but not on left (Fig. 13E-F). Collected by litter and palm berlesates and flight intercept traps from rain forest.

Kaimon thorntonensis sp. nov.
(Figs 3C, 5C, 7C, 10D, Tables 2-3)

ETYMOLOGY. From the Thornton Uplands.

MATERIAL. TYPES. All in QM. Holotype T.108851: sub. ♂, Thornton Peak via Daintree, 1150m, Monteith & Cook, 20-22 Sep 1981, RFSLMB-QM301. Paratype: 1 sub. ♂, carded (right forewing missing), as for holotype. OTHER MATERIAL. All in QM. Mt Sorrow summit, C. Tribulation, 16°.08S 145°.26E, 800m, Monteith, 15 and 19 Oct 1980, 3 sub. ♂, 7 ♀ in 3 series; 3.5-5km W C. Tribulation (sites 7, 8, 9 and 10) 16°05'S 145°26'-27'E, 680-780m, Sep-Oct 1982 and Jan-Apr 1983, MYT, 3 sub. ♂, 10 ♀ in 8 series; Roaring Meg Ck, 6km W C. Tribulation, 16°05'S 145°24'E, 710m, MYT, 5 Oct 1982, 2 ♀; Mt Hemmant, 6km SW C. Tribulation, 16°07'S 145°25'E, 880m, Monteith & Cook, 25 Apr 1983, 6 sub. ♂, 15 ♀ in 3 series.

DESCRIPTION. *Submacropterous Male.* General colour dark brown, vertex concolourous, posterior quarter of pronotal disc sometimes lighter brown. Rim of vertex pit circular with curved posterior margin formed by excavate anteromedial margin of disc in dorsal view; rim ill-defined, roundly V-shaped with minutely

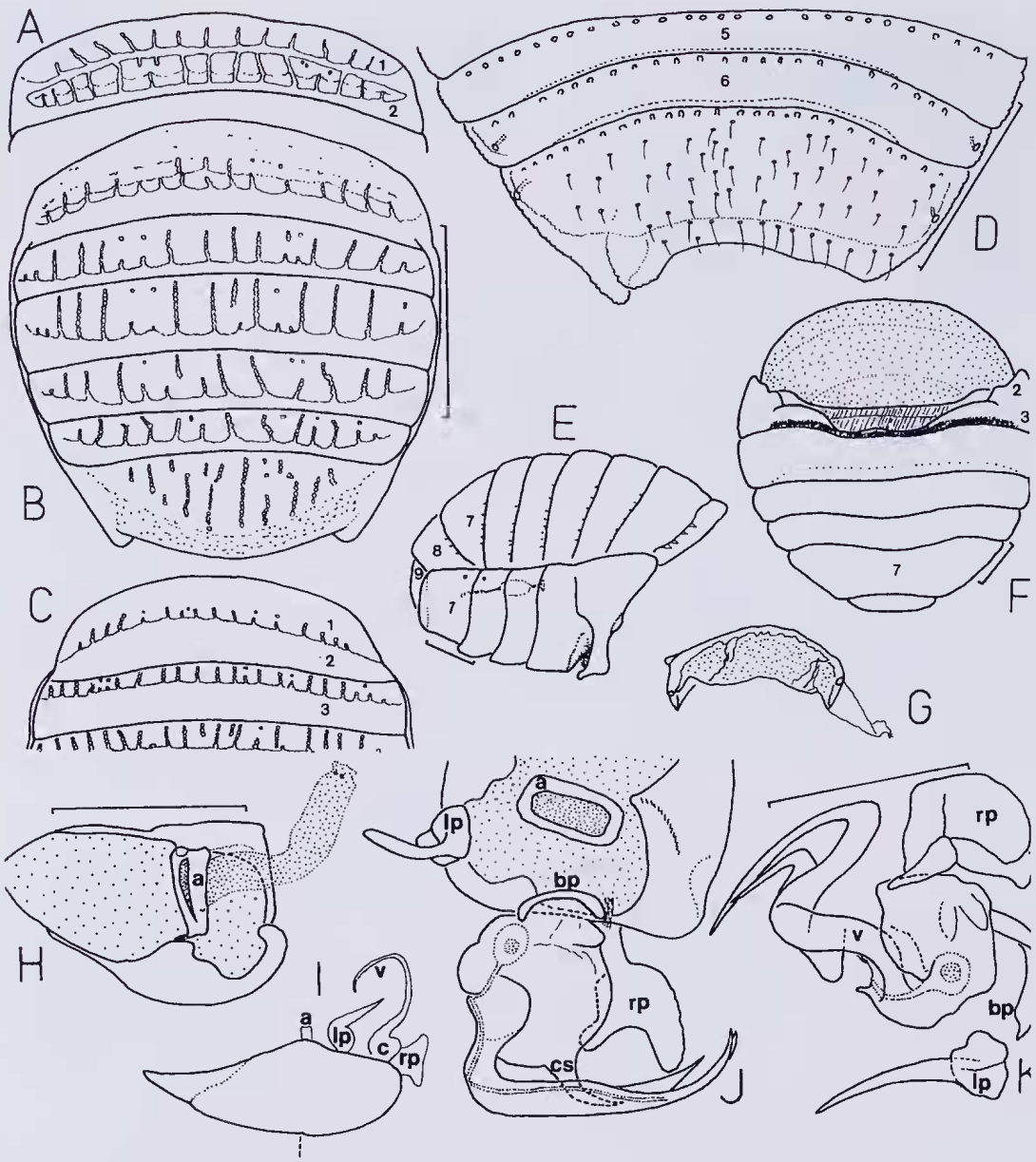

FIG. 15. A-C, abdominal terga, dorsal; A, *K. sidereoriensis*, T1+T2; B, *K. pismaensis*, T1-T7; C, *K. micropterus*, T1-4; D-F, *K. epicarsius*; D, ♂ S5-S7, ventral; E, ♀ abdomen, ventral; F, same, lateral; G, *K. polysperes*, T8, dorsal, compresed on slide; H-I, *K. epicarsius*; H, ♂ genital capsule with anophore and anal tube, dorsal; I, ♂ genital capsule with anophore and genitalia, lateral (dashed line indicates position to which capsule is retracted and hyaline); J, *K. finniganensis*, posterior half of ♂ genital capsule with anophore and dissected genitalia, dorsal; *K*, *K. micropterus*, aedeagus and parameres, dissected. Scale lines 0.1mm. a=anophore; bp=basal plate; c=conjunctival sclerites; cs=conjunctival spine; lp=left paramere; rp=right paramere; v=vesica; 1, 2, 3, 5, 6, 7, 8, 9=sterna or terga

notched apex in anterior view, rim impressed, not flush with vertex, with medial notch merging with narrow, well defined gutter in vertex; gutter

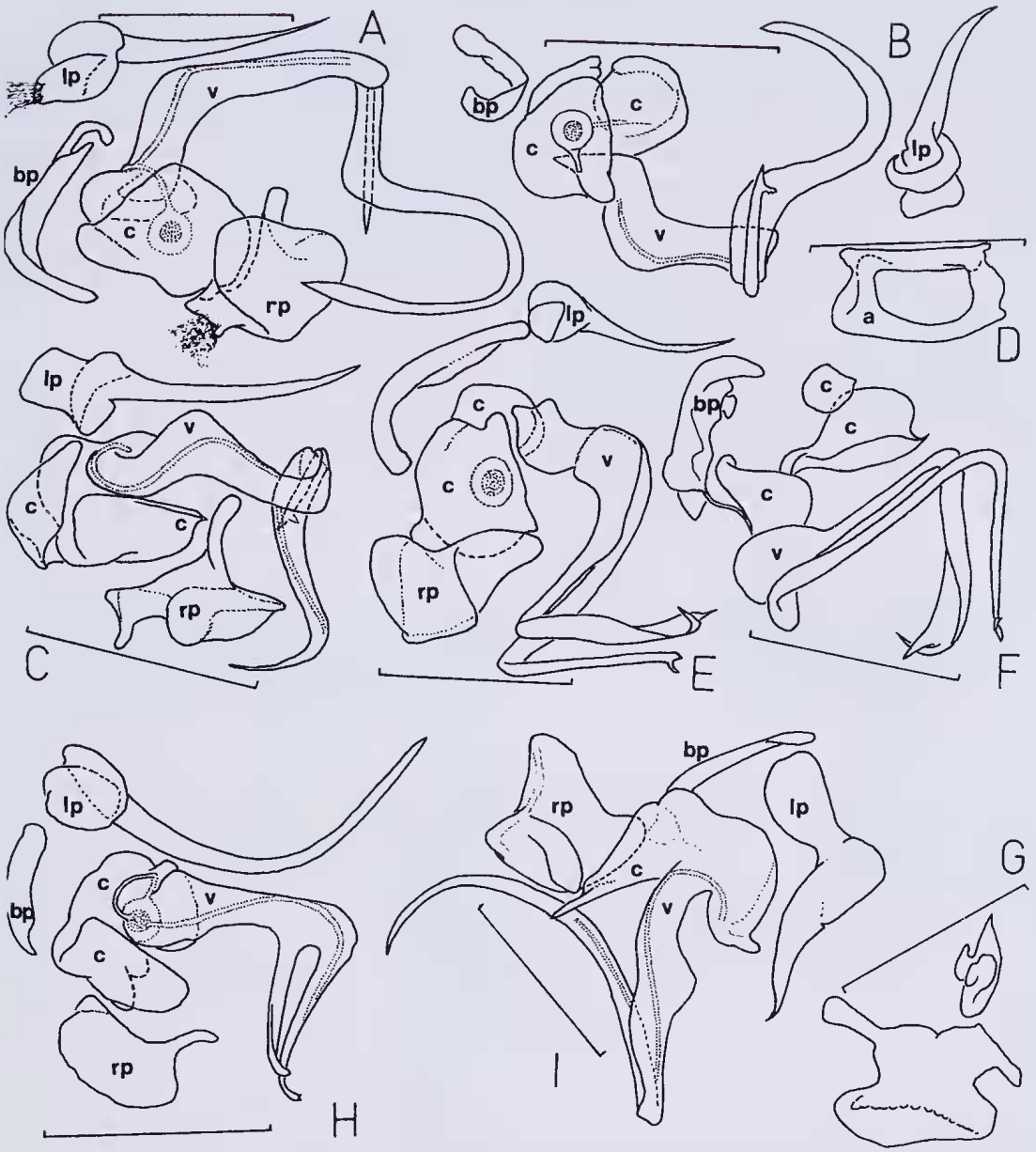

FIG. 16. A-D, *K. epicarsius*; A-C, aedeagus with or without parameres from three ♂♂; D, anophore; E-G, two ♂♂ of *K. thorntonensis*; E, aedeagus with parameres; F, aedeagus without parameres; G, right paramere and unknown sclerite; H, *K. conwayensis*, aedeagus with parameres; I, *K. mesambrinus*, same. Scale lines 0.1mm. a=anophore; bp=basal plate; c=conjunctival sclerite/s; lp=left paramere; rp=right paramere; v=vesica.

diminishing toward frons; medial ridge of pit recessed and disjunct from anterior rim of pit.

Anteromedial margin of pronotal disc forming posterior margin of vertex pit in dorsal view, points of excavate margin confluent with depressed vertex pit rim, embracing pit ridge in anterior but not dorsal view; anteromedial disc flat (not convex), perhaps weakly impressed immediately above vertex pit; disc convex anteriorly and decurved in lateral view,

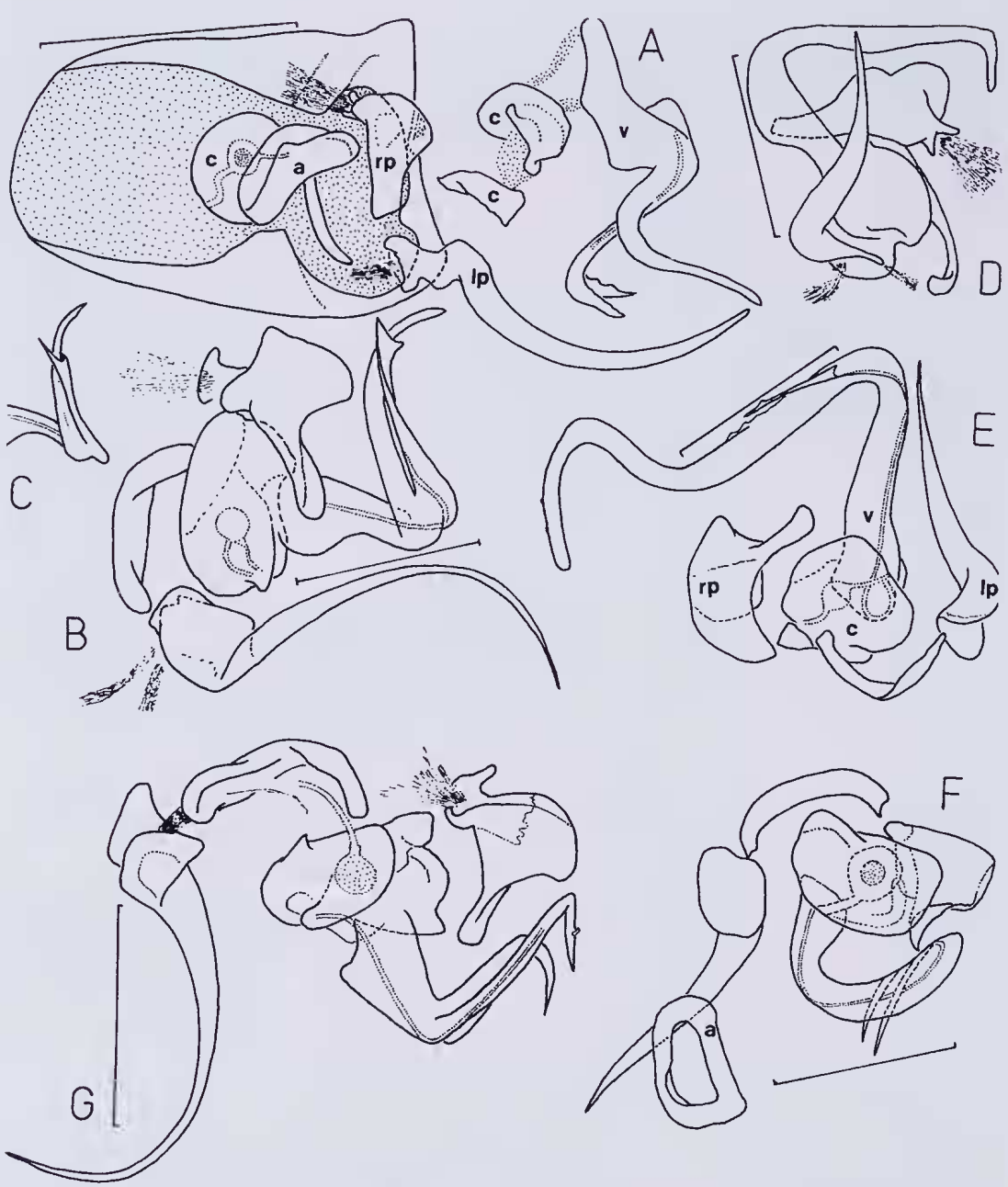

FIG. 17. A-C, *K. polysperes*; A, genital capsule dissected, dorsal; B, aedeagus and parameres, second ♂; C, detail of vesical apex from third ♂; D-G, aedeagus, basal plate and parameres; D, *K. eungellanus*; E, *K. ancylonesioticus*; F, *K. allonesioticus*; G, *K. athertonensis*. Scale lines 0.1mm. a=anophore; bp=basal plate; c=conjunctival sclerite/s; lp=left paramere; rp=right paramere; v=vesica.

concurvilinear with vertex, disc weakly convex posteriorly and smoothly continuous with anterior area in profile; lateral margins convergent anteriorly with anterior angles truncate, parallel medially but swollen posteriorly by weakly tumid humeral angles in

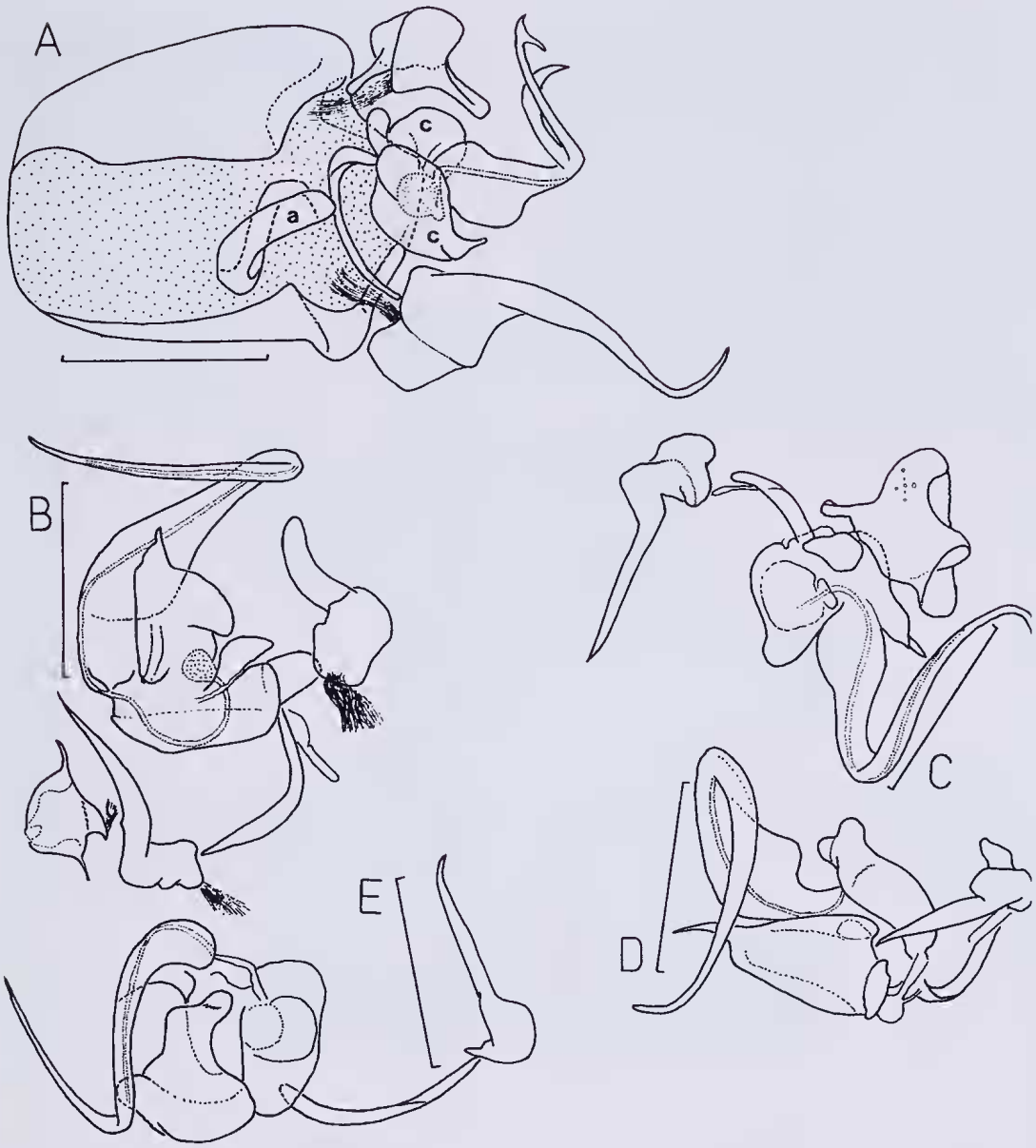

FIG. 18. A, *K. pismaensis*, genital capsule dissected, dorsal; B-E, aedeagus, basal plate and parameres; B, *K. kroombitensis*; C, *K. alleungellanus*; D, *K. byfieldensis* without right paramere; E, *K. plistonotius*;. Scale lines 0.1mm. a=anophore; c=conjunctival sclerite/s.

dorsal view; pronotal disc marginally wider near posterior margin in dorsal view; lateral margins of disc dilate; pronotal muscle scars depressed. Metapleurae prominent in dorsal view.

Forewings not paler proximally, 2 free veins subapically.

T1 granulate. Posterior margin S6 with weak asymmetric projection right of midline (like *K. finniganensis*, Fig. 14I); S7 lacking contiguous depression and tumescence on right, posterior margin weakly produced on right. Genital capsule without tumescence at right posterior angle; left paramere 0.147-0.159mm.

Conjunctival sclerites of aedeagus with short spinous process (Fig. 16F); vesica and concurved branch forming incomplete loop, vesical apex with small, recurved process; vesica with long, subequal branch, branch apex minutely bifid or trifid.

Female. Wings concolourous with body, cells not pale. Spermatheca globular.

DISTRIBUTION. Several sites on Thornton Peak and the Mt Hemmant-Mt Sorrow complex, but not the McDowall Range where *K. macdowallensis* occurs, in the Thornton Uplands region at 680-1150m.

NOTES. Macropterous male unknown. Males from sites 3-6km west of Cape Tribulation have slightly more convexity on anterior disc profile. Two females from west of Cape Tribulation are reddish brown like *K. epicarsius* and *K. melanoriensis*, rather than brown, but their wing pads are concolourous with the body. All series were collected by rain forest sieved litter berlesates except the type series which was from a litter and moss berlesate. See also *K. carbinensis* notes.

Kaimon webbensis sp. nov.
(Figs 4C, 6C, 8C, Tables 2, 3)

ETYMOLOGY. From the Mt Webb region.

MATERIAL. HOLOTYPE: sub. ♂, Mt Webb NP, 15°04'S 145°07'E, I.D. Naumann, 27-30 Apr 1981, yellow pan trap, carded ex ethanol. OTHER MATERIAL. Mt Webb NP, 15°04'S 145°07'E, Calder & J. Feehan, 27-30 Apr 1981, 2 ♀ in 2 series; in ANIC

DESCRIPTION. *Submacropterous Male*. General colour brown, vertex rim darker. Vertex pit in dorsal view square to trapezoidal, posterior wall formed by emarginate margin of protruding disc; in anterior view square, ridge and arch in disc embracing ridge barely visible, anterior margin weakly raised (Fig. 6C), with acutely defined rim, vertex not depressed anteriorly to pit, medial ridge of pit recessed and disjunct from anterior rim of pit; curvature of frons weakly flattened.

Procpimeral shelves very wide, posterior angle in dorsal view rectangular not acute or absent. Pronotal disc in dorsal view barely and loosely embracing depressed ridge of pit, points of excavate anteromedial margin of disc projecting into pit posterolaterally and inferiorly to outer rim of vertex pit, line between points concave in dorsal views perpendicular to disc and whole body axis; disc briefly sulcate above pit; convex anteriorly and weakly decurved in lateral view, concurvilinear with head profile; flat posteriorly and colinear with anterior profile; lateral margins clearly convergent in dorsal view, not dilate anteriorly but overhanging posteriorly (Fig. 6C), humeral angles weakly tumid; posterior margin of disc emarginate. Metapleurae prominent and sharing prominent angulate profile of propleural shelves in anterodorsal view.

Forewings not paler proximally; 2 free veins subapically.

T1 carinulation unknown. Posterior margin S6 simple. Disc of S7 with faint impression submedially and distinct tumescence sublaterally on right, latter near posterior margin, posterior margin weakly projecting on right. Genital capsule without tumescence on right posterior corner. Left paramere, conjunctival sclerites of aedeagus, vesica and branch unknown.

Female. Veins brown, 1 cream, closed cell.

DISTRIBUTION. One rainforest locality at unknown elevation in Mt Webb Region. The other species in this region (Table 4) is the micropterous *K. micropterus* described from a locality 30km to the south but also known in another region.

NOTES. Macropterous male unknown. No slides were prepared for this description because only 1 male is known. The emarginate posterior margin of the pronotal disc is distinctive. Collected in litter berlesates from rainforest and a yellow pan trap.

Undescribed species

No submacropterous males were available for a species (Fig. 14O-Q) from the Iron Range region. Three macropterous males of this undescribed species were sympatric with *K. sidereoriensis* in a series from 9km ENE Mt Tozer (berlesate ANIC1058). It is notable for its proepimeral shelves which project acutely at their posterior angles rather than tapering or turning squarely and the posterior margin of S6 has a digitiform ledge submedially to the right overlying S7. The vertex pit is squarish in dorsal view and its anterior margin acute and slightly raised. The medial ridge is recessed and disjunct from anterior rim of pit. The protrusion of the pronotal disc does not embrace the medial ridge, its apex is squarely truncate and without points. The disc is convex adjacent to vertex pit. In profile it is convex anteriorly and strongly decurved; weakly convex posteriorly and

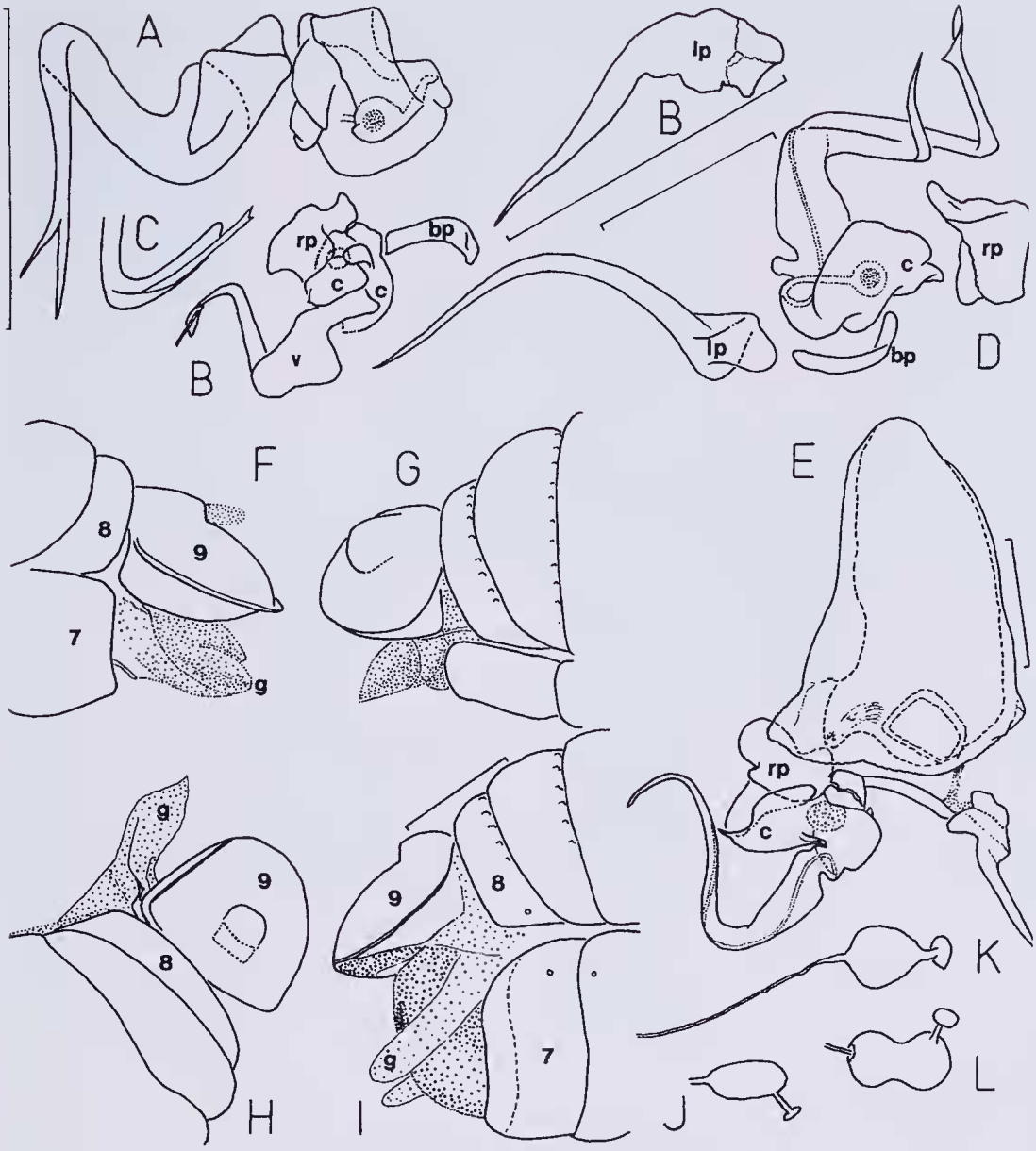

FIG. 19. A-C, *K. sidereoriensis*; A, aedeagus; B, aedeagus, basal plate and parameres, second ♂; C, vesical apex, second ♂; D, *K. allomelanoriensis*, aedeagus, basal plate and parameres; E, *K. notipolysperes*, genital capsule dissected, ventral; F-G, *K. micropterus*, ♀ terminalia; F, left lateral; G, right dorsolateral; H, *K. mesambrinus*, ♀ terminalia compressed on slide, dorsal; I, *K. ancylonesioticus*, ♀ terminalia, left lateral; J-L, spermathecae; J, *K. finniganensis*; K, *K. athertonensis*; L, *K. sidereoriensis*. Scale lines 0.1mm; F-L sketches not to scale or roughly so. bp=basal plate; c=conjunctival sclerite/s; g=anterior gonapophysis lp=left paramere; rp=right paramere; 7=sternum 7; 8, 9= terga 8 and 9.

coplanar with the anterior section. The humeral angles are tumid. The lateral margins are strongly convergent. They are dilate posteriorly but not anteriorly. T1 is granulate. The left paramere is short, 0.090mm. The genital capsule lacks a tumescence on the right posterior corner.

Another undescribed species was represented by one macropterous male from Wallaman Falls Road and is noted in the description of *K. leeiensis*.

INDETERMINATE FEMALES. Beside those mentioned above indeterminate females were seen from the following localities: 2.5km SW Mt Hartley via Cooktown; Noah Head via Cape Tribulation, 40m; Davies Creek Road, 750m; 40km W Ingham, near Wallaman Falls, 600m; Cardwell Range, Upper Broadwater Ck Valley, 750m; Kirrama Range via Kennedy, 500m; Malanda Falls, 750m; 2km SE Mt Spurgeon via Mt Carbine, 1100m; Birthday Ck, Mt Spec, 850m and Paluma Township.

DISCUSSION

DISTRIBUTION. Regional diversity is summarised in Table 4. This analysis suggests that macropters do not exist in most species. The two most widespread species, *K. epicarsius* and *K. polysperes* are two of four described species for which macropters are known (another two macropterous species are not described but their distributions have been noted above). The third macropterous described species is *K. notipolysperes* from a dozen localities at all altitudes in south-eastern Queensland and adjacent New South Wales. Perhaps the fourth, *K. sidereoriensis* from Iron Range will eventually prove to be more widespread in Cape York Peninsula. All the other described species, which all have submacropterous males and micropterous females occur in only one region. One exception is *K. micropterus*. It has a micropterous male and occurs in two disjunct regions (Mt Webb and near Carbine Uplands).

SYMPATRIC SPECIES. In many instances sympatric species include a macropterous and a non macropterous species (Table 4). If the widespread macropterous species are ignored then the most diverse region is Central Queensland around Eugella with three endemic species although this region could also be regarded as three regions (Mt Dryander, Conway Range and Eungella). Another possible exception is *K. ancylonesioticus* which may occur in Elliot Uplands and Hinchinbrook Island regions.

In *Kaimon* females of all species and males of many species are flightless whereas in *Ogeria* some males and females of at least some species appear capable of flight. In *Pachyplagia* all males and females are macropterous.

TABLE 4. Number of described *Kaimon* species per rainforest region including the four macropterous species of which *K. epicarsius* (A) and *K. polysperes* (B) are the most widespread. *K. sidereoriensis* is C and *K. notipolysperes* is D. WT, Wet Tropics Zone of North Queensland. The term Uplands is used here in regional names following Yeates et al. (2002) but some localities for *Kaimon* are lowland. Based on 167 series of specimens containing 80 macropterous and 350 submacropterous males. 1, an undescribed macropterous species occurs in the Iron Range region in addition to the described macropterous species that is tabulated. Another possibly occurs in Lee Uplands; 2, *K. micropterus* is the non endemic and non macropterous species in these two regions; 3, 1 undescribed species in or near *K. ancylonesioticus* of Hinchinbrook Island.

Region	No. of species, first value includes second	Including the macropterous species
Northern Territory	1 species, 1 endemic	
Iron Range, northern Queensland, north of WT	1 species, 1 endemic [1]	C
Mt Webb, northern Queensland, north of WT	2 species, 1 endemic [2]	
Finnigan Uplands, WT	3 species, 1 endemic	A & B
Thornton Uplands, WT	3 species, 2 endemics	A
Windsor Uplands, WT	1 species, 0 endemic	B
Carbine Uplands and Bakers Blue Mtn, WT	4 species, 1 endemic [2]	A & B
Black Mtn Corridor, WT	4 species, 2 endemics	A & B
Lamb Uplands, WT	2 species, 1 endemic	A
Malbon-Thompson Uplands, WT	1 species, 0 endemic	A
Bellenden Ker – Bartle Frere Uplands, WT	2 species, 1 endemic	A
Atherton Uplands, WT	3 species, 1 endemic	A & B
Kirrama Uplands, WT	1 species, 0 endemic	B
Hinchinbrook Island	2 species, 2 endemics	
Lee Uplands, WT	2 species, 1 endemic [1]	B
Spec Uplands, WT	1 species, 0 endemic	B
Halifax Uplands, WT	1 species, 0 endemic	B
Elliot Uplands, WT	0 species [3]	
Mt Dryander/Conway Range/Eungella, central Queensland	3 species, 3 endemics	
Byfield, central Queensland	1 species, 1 endemic	
Kroombit/Bulburin, central Queensland	2 species, 2 endemics	
Southeastern Queensland	2 species, 2 endemics	D
New South Wales	1 species, 1 endemic	

NON AUSTRALIAN DISTRIBUTION. One female, Indonesia, Sulawesi Utara, Dumoga-Bone NP, March 1985, Plot A, 200m, lowland forest, Royal Entomological Society of London, Project Wallace, BM 1985-10. One submacropterous male, Solomon Islands, Kolombangara, N of Kuzi, 3000 feet, 4 Sep 1965, ground moss, moss forest 631-640, P.N. Lawrence, Royal Society expedition, BM1966-1.

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